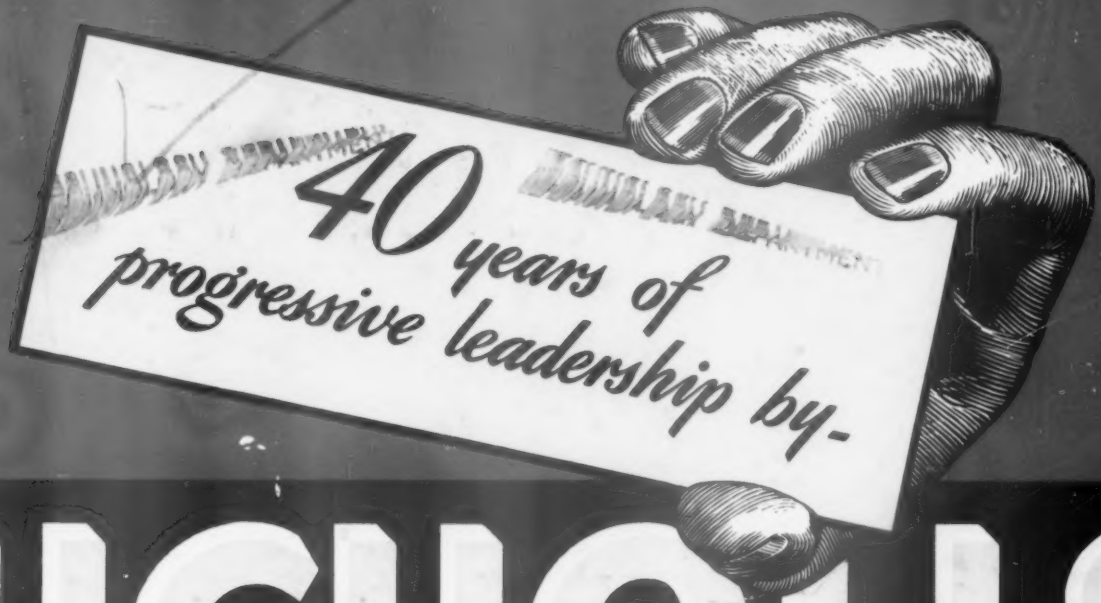
January, 1950

THE FOUNDRY

wherever metals are cast...



NICHOLLS

HEAVY DUTY MOLDING MACHINES

Your help . . . your continued support . . . helped make us leaders in our field. To us, that leadership means greater service to you in the future. Nicholls Molding Machines of Today . . . and Tomorrow . . . will reflect that welcome responsibility in progressive power and precision.

WM. H. NICHOLLS CO., INC.

126th ST. and NICHOLLS AVE., RICHMOND HILL 18, NEW YORK

FOREIGN MANUFACTURERS AND SELLING AGENTS FOR CONTINENTAL EUROPE AND GREAT BRITAIN—GEORGE FISCHER, LTD., SCHAFFHAUSEN, SWITZERLAND.

R v. 78 Jan.–June 1950

*Purite

FOUNDRY-PROVED ADVANTAGES GUARANTEE

Better Castings

When foundry after leading foundry changes to Purite and then continues to use it, you know there must be good practical reasons for the success of this economical desulphurizer and cupola flux. There are! Just note these outstanding advantages:

1. **Purite gives 100% fluxing action in the cupola.**
2. **Purite is the best and most economical refining and desulphurizing agent for either forehearth or ladle treatment.**
3. **Purite comes in 2-lb. briquettes—no weighing or measuring required.**
4. **Purite is 100% fused soda ash—you do not pay for inert materials.**
5. **Purite does not crumble—no waste—no dust.**
6. **Purite can be shipped in bulk carloads at substantial savings over bag shipments—is easily stored without deterioration.**

*PURITE

100% FUSED SODA ASH

The Scientific Flux for Better Melting and Cleaner Iron

These day-to-day benefits explain why leading foundries throughout the country regard Purite as the foremost cupola flux and ladle desulphurizing agent. Write today for specific information on how Purite can improve your iron. Mathieson Chemical Corporation, Mathieson Building, Baltimore 3, Maryland.

Mathieson CHEMICALS

PUBLIC LIBRARY
JAN 3 - 1949
DETROIT

HOW WOULD [illegible] PRODUCE

FULL-LENGTH HOLLOW CORES *in these Stainless Steel Castings?*

THE PROBLEM: These huge agitator blades for a leading manufacturer of plastics were specified in Cooper Alloy 17S, an austenitic chromium-nickel stainless steel corresponding in alloy content to Alloy Casting Institute's CF 8 designation.

Each casting, measuring seven and one-half feet in length, and weighing one thousand, five hundred and fifty pounds, was designed with a one and one-half inch hollow core running the full length . . . to provide a passage for water or steam with which to heat or cool the blade while in service.

Experience indicated that because of the unusual shape of the blades sand cores would be unsatisfactory and very unlikely to withstand the pressures and metal temperatures during casting.

HOW COOPER ALLOY FOUNDRY SOLVED IT: In place of a sand core, this foundry selected stainless steel tubing of the same composition as the cast alloy. Realizing that heat generated by the poured molten alloy would melt and deform the tubing, Cooper engineers developed a procedure whereby water was continuously forced through this stainless tube while the casting was being poured. Thus, the temperature was held below the melting point of the tube, and a satisfactory cored hole was assured.

Our casting specialists are always glad to help suggest suitable compositions of stainless alloys containing nickel for specific applications. Send us details of your problems for our suggestions.

EMBLEM OF INCO SERVICE
TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the properties, treatment, fabrication and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes, nickel silver, cupro-nickel and other alloys containing nickel. This information is yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

A STAR PERFORMER in All Foundries

C-120 GRADE
100 LBS
CROWN HILL
SEACOAL FACING
100 LBS
"CROWN HILL MEANS QUALITY SEACOAL"
MANUFACTURED ONLY BY
THE FEDERAL FOUNDRY SUPPLY CO
CLEVELAND, OHIO
CROWN HILL, W. VA. - CHICAGO - DETROIT - MILWAUKEE
NEW YORK - RICHMOND, VA. - MINNEAPOLIS - UPTON, WYO.
CHATTANOOGA, TENN. - ST. LOUIS, MO.

FIGURES FROM BUREAU OF MINES
DEPT. OF INTERIOR OF THE U. S.
(Moisture Free)

PROXIMATE ANALYSIS

Volatile Matter (V.C.M.)	38.9%
Fixed Carbon	57.4%
Ash	3.7
	100.0

ULTIMATE ANALYSIS

Hydrogen	4
Carbon	82.0
Nitrogen	1.8
Oxygen	8.1
Sulphur	.4
Ash	3.7
	100.0

★ Star performer Crown Hill Seacoal Facing has real foundry appeal:

A. It vents the mold quickly.

B. Eliminates hard spots.

C. Makes peeling easy.

There's a reason, in fact three reasons for these advantages: (1) Crown Hill is made from selected, high volatile flash coal; (2) it has extremely low sulphur content; (3) the fusion point of the little ash residue is 2980 degrees F.

Crown Hill does cut cleaning costs substantially. Try Crown Hill Seacoal Facing . . . made by the long-time friend of the foundries—The Federal Foundry Supply Company.

THE FEDERAL FOUNDRY SUPPLY COMPANY

Seacoal Plant
CROWN HILL, W. VA. • CHICAGO • DETROIT • MILWAUKEE • RICHMOND, VA.
CHATTANOOGA, TENN. • NEW YORK • ST. LOUIS • Mines UPTON, WYO.
IN TWIN CITIES: Wisner and Company

4600 East 71st Street
Cleveland 5, Ohio

JANUARY, 1950

THE FOUNDRY

VOLUME 78—NUMBER 1

EDITORIAL STAFF

FRANK G. STEINEBACH
Editor

WILLIAM G. GUDE
Managing Editor

EDWIN BREMER
Metallurgical Editor

PAT DWYER
Engineering Editor

ROBERT H. HERRMANN
Associate Editor

DON S. CADOT
Art Editor

VIRGINIA C. TAYLOR
Assistant Editor

VIRGINIA B. HARMS
Assistant Editor

New York.....B. K. PRICE, L. E. BROWNE
Chicago.....E. F. ROSS, H. C. TUTTLE
Detroit.....A. H. ALLEN
Pittsburgh.....J. C. SULLIVAN
Washington.....E. C. KREUTZBERG
London.....VINCENT DELPORT

Advisory Staff

JOHN W. BOLTON
JOHN HOWE HALL
ALBERT E. GROVER
HARRY A. SCHWARTZ

BUSINESS STAFF

J. M. LATHROP, *Advertising Manager*

New York.....J. F. AHRENS
Chicago.....G. A. POPE, A. W. JOHANSEN
Cleveland.....A. L. KLINGEMAN
Los Angeles.....F. J. FULLER

Circulation Department

KENNETH L. MOUNTAIN, *Manager*

Production Department

A. V. ANDERSON, *Manager*
W. J. STAAB, *Assistant Manager*

Main Office

Penton Building, Cleveland 13, Ohio

Branch Offices

New York, 17.....16 East 43rd St.
Murray Hill 2-2581
Chicago, 11.....520 N. Michigan Ave.
Whitehall 4-1234
Detroit 2.....6560 Cass Ave.
Madison 3024
Los Angeles, 4...130 N. New Hampshire Ave.
Dunkirk 2-1758
Pittsburgh, 19.....2806 Koppers Building
Atlantic 1-3211
Washington, 4.....National Press Building
Executive 6849
London.....2 Caxton St.
Westminster, S.W. 1

Published by

THE PENTON PUBLISHING COMPANY

E. L. SHANER.....*Chairman and Treasurer*
G. O. HAYS.....*President*
R. C. JAENKE....*Vice Pres., Director of Adv.*
F. G. STEINEBACH...*Vice Pres., and Secretary*

Also publisher of STEEL • MACHINE DESIGN
NEW EQUIPMENT DIGEST

Subscription: In the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $3; two years, $5. Other foreign countries, $6. Single copies 35 cents. Copies published three months or more previous to date of current issue, 50 cents.

Member: Audit Bureau of Circulations and National Publishers Association. Copyright 1949 by THE PENTON PUBLISHING CO.

Entered as second class matter at postoffice at Cleveland under act of March 3, 1879.

THE FOUNDRY is indexed regularly by Engineering Index Inc.
29 West 39th St., New York 18

Editorial 53

A Foundryman Abroad 54
By A. W. GREGG

Melting Practice for Copper-base Alloys 56
By R. A. COLTON

Factors Affecting Development of Ductile Iron 58
By DONALD J. REESE

Problems in Producing Ductile Iron 62
By MAX KUNIANSKY

Ideas Pay Off in Cash 65
By ROBERT H. HERRMANN

Mechanized Foundry Makes Farm Implement Castings .. 66
By PAT DWYER

Flasks and Rigging for Steel Castings 70
By JOHN HOWE HALL

Modern Practice in Investment Casting 74
By HIRAM BROWN

Development of Furnaces for Malleable Iron Annealing .. 80
By C. H. MARTIN and H. J. HAMMOND

Plans Progress for AFS Cleveland Convention 99

New York Foundry Conference 102
By ROBERT H. HERRMANN

Man-to-Man on the Molder's Bench 108
By RALPH L. LEE

Around Detroit 122
By ARTHUR H. ALLEN

Molding Machines Installed on Foundry's Second Floor .. 128

French Foundry Association Holds Annual Meeting 131
By VINCENT DELPORT

Core Handling Simplified in Modernized Foundry 138

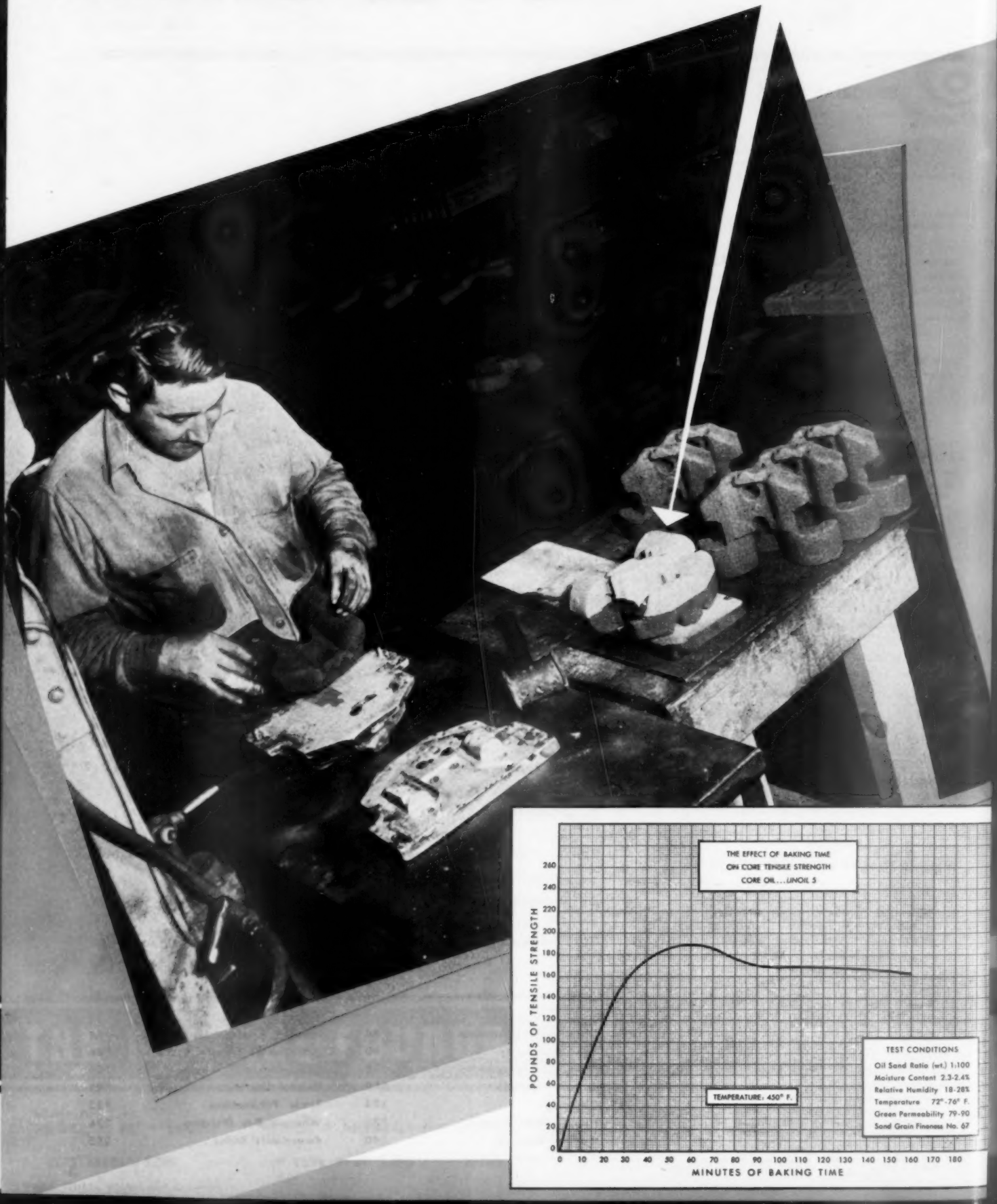
Purdue Casting Conference 142
By FRANK G. STEINEBACH

ASTM Holds Pacific Area Meeting 154

The Adventures of Bill 184
By PAT DWYER

Questions and Answers 84
Men of Industry 90
Foundry Developments 116
Foundry Statistics 119
Obituary 124
Foundry Data Sheet 125
Meeting Calendar 140
Industry Briefs 148
Activities of Foundry Groups .. 156
Equipment and Supplies 190
Helpful Literature 193
Trade Publications 222
Where-to-Buy Directory 236
Advertisers' Index 255

LINOIL "TOP-OFF"



"CORES SAVE TIME; ADD QUALITY

at

FOREST CITY FOUNDRIES · CLEVELAND, OHIO

This Forest City coremaker takes only a few seconds to blow and draw a core half for a pressure body casting . . . but it used to take much more time just to assemble two baked halves—to paste them, join them, then mud the joint line to get smooth surfaces.

Now, however, the job is assembled by "top-off" cores—a procedure that uses an already baked bottom core half as the drier for a green top half. The assembly goes into the ovens, where the top section—as it bakes—seals itself to the bottom core. The resulting joint line is so smooth that mudding is practically eliminated . . . and core quality improves as assembly time shrinks to almost nothing.

The chart shows how LINOIL'S baking characteristics help to make "top-off" cores possible. LINOIL reaches its peak strength rapidly—between 70 and 80 minutes in Forest City's 460° ovens. When baked through two oven cycles, (160 minutes) its strength is still way up. LINOIL takes extended periods of over baking with just a small strength loss. Forest City offsets this slight loss by making the bottom half cores with a sand-oil ratio of 100-1, while the top halves are made at their normal ratio of 125-1, by weight.

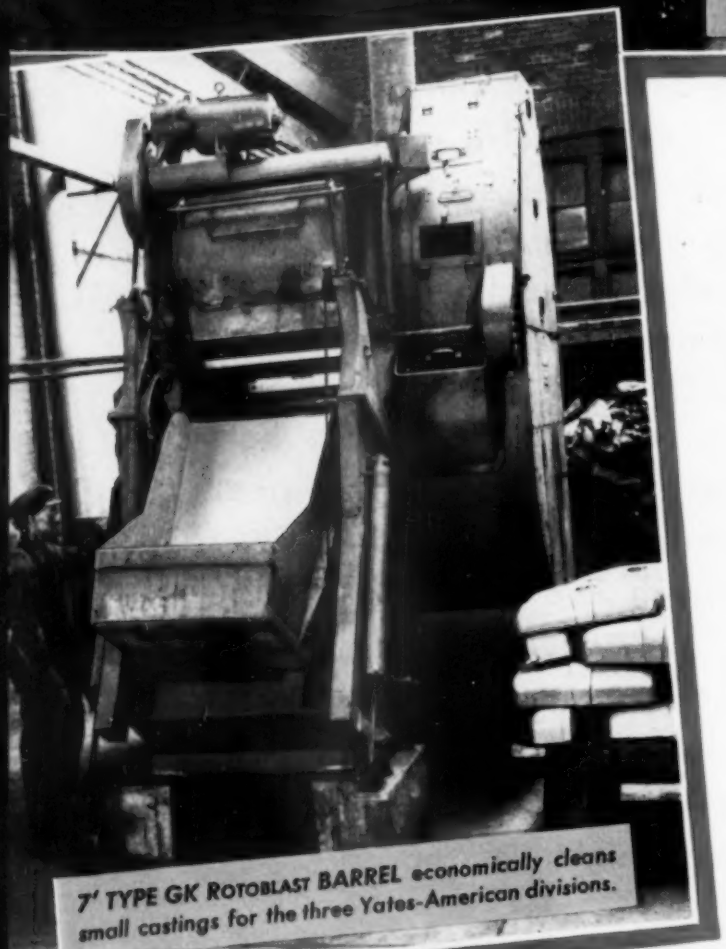
THE LINOIL — THE LOGICAL OIL

WERNER G. SMITH COMPANY

(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 WEST 110th STREET · CLEVELAND 2, OHIO

TYPE LH ROTOBLAST TABLE swiftly cleans large castings for products made by all divisions of Yates-American.



7' TYPE GK ROTOBLAST BARREL economically cleans small castings for the three Yates-American divisions.

PANGBORN ROTOBLAST:

CLEANS FASTER because it throws more abrasive over a larger area with greater density.

CLEANS BETTER because it produces a finer surface than old-fashioned methods.

CLEANS CHEAPER because it requires less horsepower, uses less man power, needs less maintenance, eliminates need for air compressor!

IN addition to their ROTOBLAST team of Table and Barrel, Yates-American uses equally efficient Pangborn Dust Control. Now maintenance costs are lower and worker efficiency has been increased because dust concentrations which hamper production have been eliminated!

MORE THAN 25,000 PANGBORN MACHINES SERVING INDUSTRY

Pangborn

* Trademark of Pangborn Corporation

Pangborn ROTOBLAST*

SAVES $5,080

a year for YATES-AMERICAN MACHINE CO.

IMPORTANT NEWS IF YOU CLEAN LARGE OR SMALL CASTINGS . . .

YATES SAVINGS CHART

	Old Method	ROTOBLAST
Small Castings	3 hours	10 minutes
Large Castings	45 minutes	12 minutes
Labor		2 men released for other work

REMARKS:
Foreman says: "Economical! This machine is even more economical on abrasive than Pangborn told us!"

WANT TO CUT CLEANING COSTS? Here's how Yates-American Machine Co. saves money in their cleaning room:

Their new Pangborn ROTOBLAST team of Barrel and Table cleans small castings *18 times faster* . . . large castings *3.7 times faster* than ever before! *Actual cash savings* add up to $5,080 a year on labor alone and two men are released for other work. Additional savings on machining result from *cleaner castings* . . . and down-time is virtually eliminated! In addition, five old-fashioned tumbling mills with their dust and dirt have been removed by ROTOBLAST.

YOU CAN SAVE MONEY in your cleaning room with ROTOBLAST . . . the truly *effective* way to cut cleaning costs! Send coupon for your free copy of Bulletin 1200 for full facts. Address: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.

CH-2 PANGBORN DUST COLLECTOR keeps plant clean, stops dust which shortens life of machines, bearings, etc.

Look to Pangborn for the Latest Developments in Blast Cleaning and Dust Control Equipment.

MAIL COUPON NOW!

PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.
Please send me free copy of Bulletin 1200.

NAME .....

COMPANY .....

ADDRESS .....

CITY ..... ZONE..... STATE.....

BLAST CLEANS CHEAPER

with the right equipment for every job

"Control Over Quality And Costs Paramount"

THE FOUNDRY — WHEREVER METALS ARE CAST

—MAKES IT WORTH WHILE TO

"Champion

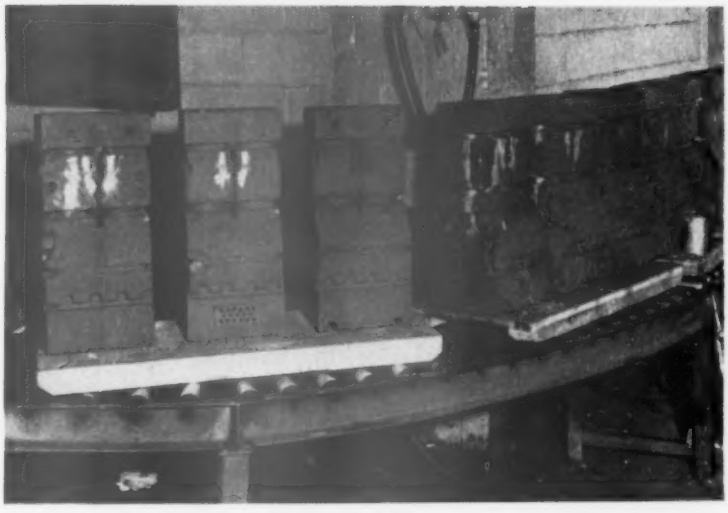
YOUR FOUNDRY

You take a long step forward toward quality and cost control when you equip with Champion Core Blowers and Molding Machines. Foundrymen of long experience designed and built these machines on the basis of a sound knowledge of what it takes to produce high quality castings at a profit. That's why you'll find Champion equipment at work in the leading foundries such as those represented in this advertisement.

Champion CB12 Core Blower, at National Sewing Machine Company, Belvidere, Illinois, blows cores for this late model portable electric sewing machine. "They do a first class job, FAST."

Champion CB18 Core Blower at Oliver Farm Equipment Company's foundry at Charles City, Iowa. Six similar sections blown on this machine form the core of a six cylinder gasoline engine casting, used in the power plant of the latest type farm tractor.

ize"



From the newest, smallest model, the "Junior" Champion, up to the mammoth CB400, every Champion Core Blower possesses the same distinctive features, the same unique blow valve, which assure a perfect core every time, in a fraction of a second, with the standard air pressure of 85 pounds.

Operation is safe, simple, speedy! There's a size and type for every job. Talk with us about your core requirements . . . you'll find it pays!

CHAMPION FOUNDRY AND MACHINE COMPANY

SALES OFFICE: 1314 W. 21st STREET, CHICAGO 8, ILLINOIS

GENERAL OFFICE AND PLANT: ROCKFORD, ILLINOIS

MOLDING MACHINES **CORE BLOWERS** **THE ELECTRIC RIDDLE**

A/B Westin & Backlund
8 Liljeholmsvagen, Stockholm, Sweden

Bonvillain & Ronceray, Inc.
Rue Paul Carle, Choisy Le-Roi, France

W. F. Guth Industrial Equipment & Furnace Co.
Avenida R. S. Pena 852, Buenos Aires, Argentina

Mauricio Hochschild & Cia. Ltd.
Casilla 153 D, Santiago, Chile

Societa Torinese Adesivi Resine
Corso Moncalieri 414, Torina, Italy

End VEINING & METAL PENETRATION

IN YOUR CORE SAND MIXES

WITH....

Add only a small quantity of DELTA NO-VEIN COMPOUND (1% to 3% maximum) to your core sand and eliminate troublesome veining of cores.

DELTA NO-VEIN COMPOUND is a specially prepared and compounded series of oxides which develop the necessary plasticity and hot strength without, in any way, deteriorating the sand.

DELTA NO-VEIN COMPOUND retards sand grain expansion, practically eliminating the possibility of metal penetration.

Write for a liberal working sample. You will also receive complete instructions for use.

OTHER DELTA FOUNDRY PRODUCTS TO CUT PRODUCTION COSTS

PLASTIC-type Core & Mold Washes . . . For Steel, Malleable, Grey Iron and Non-Ferrous Metals, Highly refractory, Waterproof, Non-deteriorating.

CHILLKOAT . . . Eliminates use of metal chills on Grey Iron Casting.

SPRAY BINDERS . . . Produce dry sand mold properties.

PERMI-BOND . . . The economical, highly efficient Seacoal Replacement.

BONDITE . . . The NEW Waterproof 100% Dry Binder.

PARTEX . . . The original, and ONLY, Nut Shell Parting.

MUDDING COMPOUNDS . . . Highly refractory material for mudding and patching joints.

CORE ROD DIP OILS . . . Make stronger cores. Cause sand to adhere to core rods and wires, after baking.

SAND CONDITIONING OILS . . . Stop all sticking of sand in core boxes.

PYRO-KOAT . . . A new powder wash — when applied as directed on green sand molds produces dry sand mold results.

LIQUID PARTING . . . Lowest cost per gallon. Gives maximum coverage. Requires fewer applications. Non-hazardous to use.

CORE OILS & BINDERS . . . For better tensile strength . . . better core elasticity . . . low gas . . . excellent workability. Cleaner casting surfaces.

DELTA OIL PRODUCTS CO.

MILWAUKEE 9, WISCONSIN

A Hand Full of Helps and Hints

on how to slash material handling costs in foundries and metal working plants

These actual authorized job studies show and tell how it is done with

PAYLOADERS

Here's a Job Study of a foundry that uses six Model HA Payloader tractor shovels to pick up, carry, pile, spread, windrow, dump and load sand . . . to handle sprues, slag, bond and broken cores. They've taken many laborious tasks off the backs and arms of men, have cut material handling costs substantially and have speeded foundry production without sacrificing flexibility of operations.

Job Study No. 10 pictures and describes how a combined foundry and machine shop uses Hough Payloaders to unload sand from gondola cars, to handle sand and other materials in the foundry, to transport castings in the foundry and machine shop and to load finished products on trucks for shipment.

Both of these Job Studies are full of cost-cutting ideas and are available without obligation. Simply fill out the coupon below and mail it to The Frank G. Hough Co., 703 Sunnyside Avenue, Libertyville, Illinois.

HOUGH
PAYLOADER
Manufactured by THE FRANK G. HOUGH CO.

Send me, without obligation, the two Payloader Job Studies Nos. 10 and 17.

Name_____ Title_____

Company_____

Street_____

City_____

State_____

Are you on the right track?

Today foundry practice demands low operating costs. Are you on the right track? Take the road that leads to substantial savings... reclaiming used sand—sand that looks like new... works like new... the "Nichols way"... at a cost far below new sand.

Reduce sand shipments.

Eliminate sand disposal costs and problems.

Nichols equipment is broad enough in design and modifications to bring it well within the range of every foundry.

Nichols engineers will be glad to review your sand problems and offer sound, practical suggestions or complete plans.

We invite your correspondence.

NERCO

NICHOLS ENGINEERING & RESEARCH CORPORATION

70 PINE ST., NEW YORK 5, N. Y.

40 S. Los Robles Ave. Pasadena, Calif. • 1477 Sherbrooke St. West, Montreal 25, Canada

HERE'S HOW...

CHICAGO TRANSIT AUTHORITY CUTS MELTING TIME IN HALF

. . . cuts fuel cost 50% . . . cuts metal losses 40%

Chicago Transit Authority, one of the world's largest transportation systems, operating 2,400 streetcars, 1,625 elevated cars, and 1,100 buses, installed a Fisher oil fired Simplex Melting Furnace for remelting, reclaiming scrap, brass, and bronze. Journal and axle bearing brasses and worn parts from all types of rolling stock are melted down and recast into new parts.

The new Fisher Simplex replaces a conventional oil fired spherical type open flame furnace. Check this "Before and After" story of faster melting, lower fuel cost, and lower metal losses.

	BEFORE	AFTER
Heating time 1000 lb. charge	2½ hrs.	1 hr.
Fuel cost per pound melted	$.0056	$.0027
Metal Loss	5%	3%

Ask for bulletin #28-A "Fisher Simplex Furnaces."

FISHER ADVANTAGES

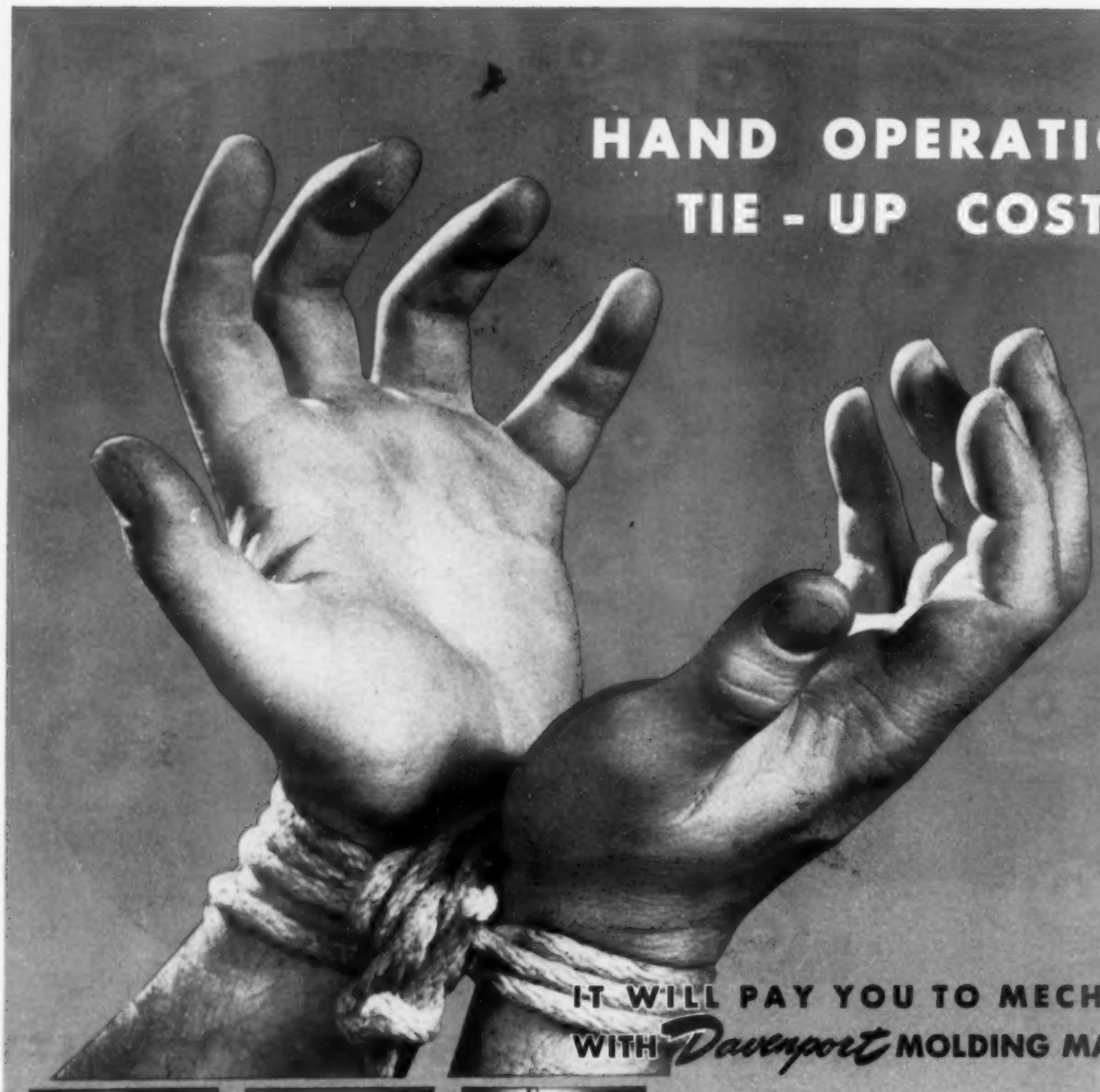
Furnace charges *easily* from front at convenient height. . . . More scrap can be charged because of large area above molten metal line. . . . Uses open flame reverberatory melting, the *fastest* fuel fired melting method. . . . Two section furnace shell removable for *easy* relining.

Fisher Furnaces

A DIVISION OF LINDBERG ENGINEERING CO.

2453 West Hubbard Street, Chicago 12, Illinois

HAND OPERATIONS TIE - UP COSTS

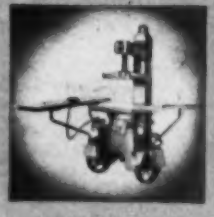


IT WILL PAY YOU TO MECHANIZE WITH *Davenport* MOLDING MACHINES

Jolt Rollover Draw, Model A

Jolt Rollover Draw, Model SA

Jolt Squeeze, Model 10-JX (stationary)



Jolt Squeeze, Model 10-JX (portable)

Jolt Pin Lift Model AJS (stationary)

Jolt Pin Lift, Model AJS (portable)

You wouldn't expect a man in your shop to move sand without a shovel.

You wouldn't expect a man to cut your grass without a lawn mower.

Give your men labor saving tools and watch your operating costs go down.

DAVENPORT MOLDING machines will save man hours—improve your casting and lower your costs. Let us send you our catalog—it will be worth your time to look it over.

Pay for themselves in a short time.

DAVENPORT MACHINE AND *Foundry Company*

DAVENPORT, IOWA, U.S.A.

CANADA:
Canadian Foundry Supplies & Equip. Ltd.
Toronto and Montreal

REPRESENTATIVES
FRANCE * BELGIUM * HOLLAND * LUXEMBURG * SWITZERLAND
Ph. Bonvillain & E. Ronceray, Choisy-Le-Roi
Rue Paul Carle, Seine, France

ALL OTHER FOREIGN COUNTRIES
R. K. Price Associates, Inc.
70 Pine St., New York 5, New York, U.S.A.

FALCON BRONZE FOUNDRY • YOUNGSTOWN, OHIO

...a 28 year continuous user of Truscon Steel Foundry Flasks!

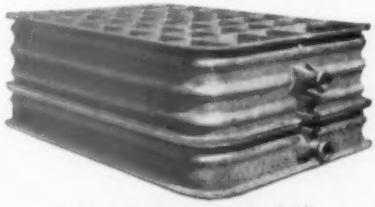
Truscon Steel Foundry flasks in actual molding use at the Falcon Bronze Foundry, a 28-year continuous user!

● There are big Truscon Flasks in Falcon service, and there are small ones . . . but all of them have been delivering the same standard of dependable, heavy-duty performance for 28 years. There's no doubt about . . . Truscon puts real value into its flasks, and customers get this value delivered in steady, day-after-day, satisfactory output.

Truscon delivers much more than just your order of flasks. Truscon's long experience in flask design . . . Truscon's highly efficient facilities for flask production and service . . . Truscon's long association with flask users in every branch of the foundry industry . . . these are *plus* features that make your dollar investment in Truscon Steel Foundry Flasks so much more profitable.

Truscon manufactures one-man, two-man and power handled steel flasks to meet your own particular production requirements. Write for catalog showing wide range of Truscon Steel Flasks available, and ask for an experienced Truscon foundry man to help plan your needs efficiently.

Truscon OM-1 One-Man Flask



Truscon CH-40 Crane Flask

Truscon TM-10 Two-Man Flask

TRUSCON STEEL COMPANY

PRESSED STEEL DIVISION
6202 Truscon Avenue, Cleveland 4, Ohio
Subsidiary of Republic Steel Corporation

Round Flasks and

2-Part Flasks

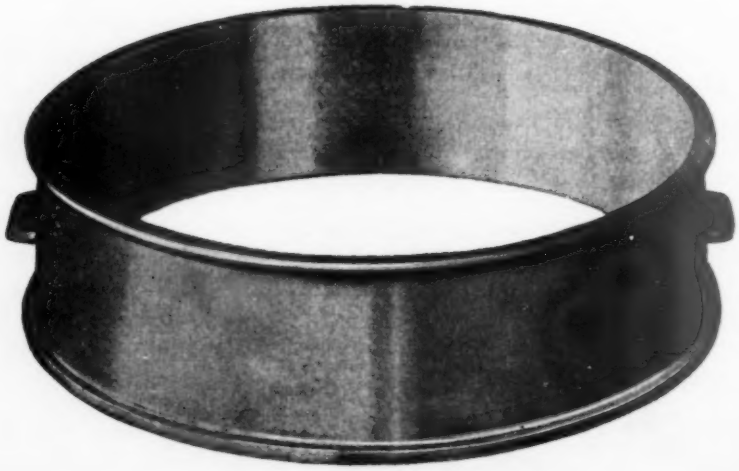
3-Part Flasks

Any Diameter
12" THROUGH 34"
(Even Inches)

Any Height
COPE AND DRAG

THE JACKETS

Hines Round Jackets are available in either aluminum or cast iron. They are carefully machined to assure perfect fit on molds.



THE HINES

3431 WEST 140th ST.

Jackets by Hines

Hines Round *Aluminum* Slip Flasks in either two or three parts are unequalled for making fire pots, sprocket wheels, gears, pulleys, etc. They are lightweight, easy to handle and will turn out more castings with less sand. They put jobs on the bench and machines that were previously made on the floor. Replace tight boxes, eliminate shakeout costs and save valuable foundry space. One flask makes any number of molds. A most flexible flask in any foundry. Pins are hardened, ground and heavy chrome plated. Diameters in even inches from 12″ through 34″, any height. Companion jackets available in either aluminum or cast iron.

Write for Quotations—Specify Diameters and Heights Desired

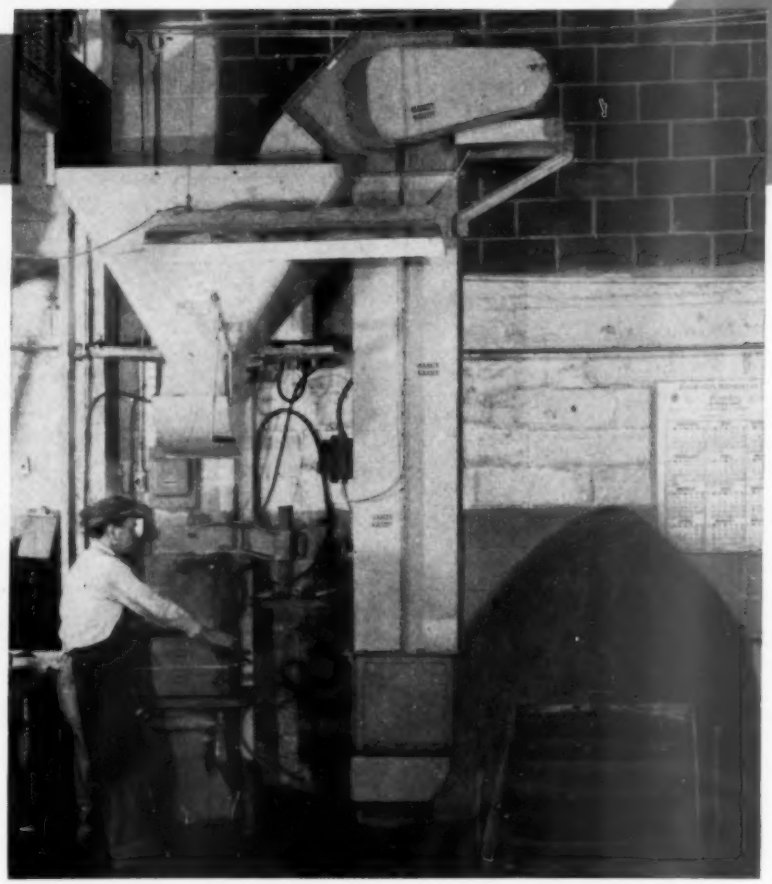
S FLASK CO.

CLEVELAND 11, OHIO

DETROIT PUBLIC LIBRARY

the new HANDY SANDY increases molder's output 50 molds per day

at the MICHIGAN WHEEL COMPANY
Grand Rapids, Michigan



Test proves Cost Reducing Advantages of HANDY SANDY

When a molder is shoveling, he is not producing. Replace his shovel with a Handy Sandy and he will turn out more molds for you at less cost per mold. This was the result when the Michigan Wheel Company tried a Handy Sandy in casting 4 pound propellers from Manganese Bronze. When filling the flasks by hand, one molder produced from 50 to 55 molds per day. NOW, with a Handy Sandy supplying the sand, the same man turns out from 90 to 100 molds daily — and still "feels like working another shift."

According to Mr. W. R. Royce, Foundry Superintendent, the sand is more thoroughly conditioned and all lumps are eliminated by the extra aeration of the Handy Sandy. Hand riddling is no longer necessary due to the improved condition of the sand. Castings have a better appearance, there are fewer rejects and all excessive grinding and finishing have been eliminated.

"What's more," says Mr. Royce, "The Handy Sandy takes no more space than the sand heap. It's ideal where space is at a premium. We are going to equip the Foundry throughout."

GIVE YOUR MOLDERS A LIFT WITH A HANDY SANDY AND WATCH YOUR PROFITS GROW.

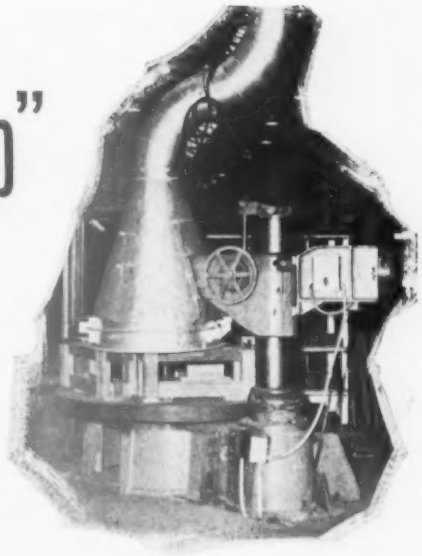
Write for full details today.

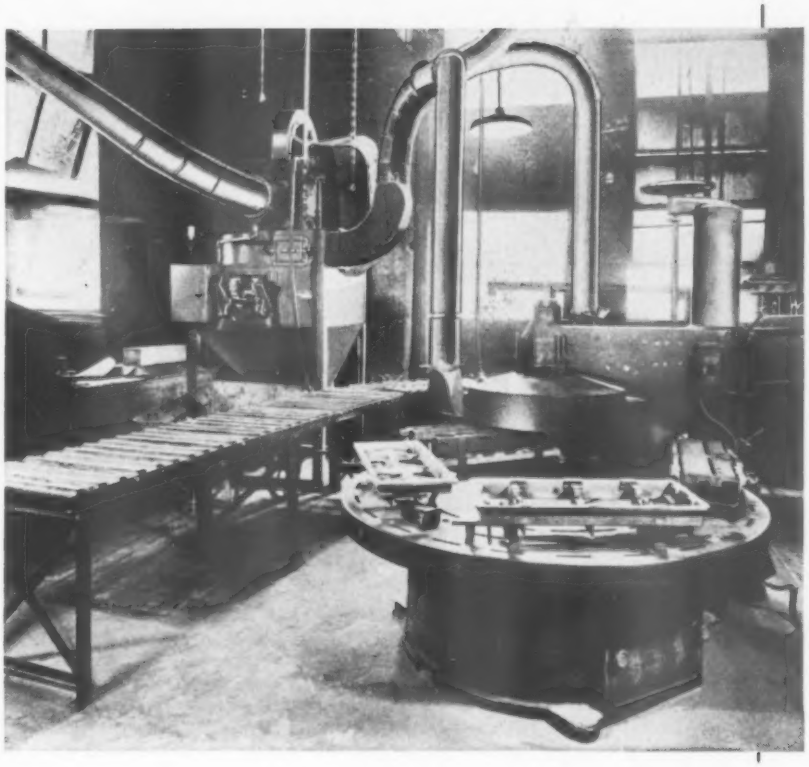
NEWAYGO ENGINEERING COMPANY

NEWAYGO, MICHIGAN

Manufacturers of NeWay Mold Handling, Sand Handling and Conditioning Equipment

Core grinder dust is "Duck Soup" for ROTO-CLONE





THOSE fine sand particles generated by core grinding can be a major foundry irritant—but they never see the light of day with a Roto-Clone* on the job.

Pictured at left and above are two effective types of hood arrangements for this service. Each is served by that foundry favorite—the Type W Roto-Clone. Dust that formerly clouded the atmosphere is now converted quickly into a harmless, easily-disposed-of sludge.

Efficient dust control and the Type W Roto-Clone are synonymous in the minds of the industry. Shakeouts, sand conditioners, abrasive cleaning units, electric furnaces and core grinders—all have "come clean" under the magic touch of this compact, economical and easily maintained unit.

For information on the Type W and other high efficiency units in the complete Roto-Clone line, write for Bulletin No. 270. There's a type and size to solve every foundry dust problem.

AMERICAN AIR FILTER COMPANY, INC.
266 Central Avenue, Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P.Q.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

**Roto-Clone is the trade-mark (Reg. U.S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydrostatic precipitator types.*

®AAF

ROTO-CLONE®
DUST CONTROL EQUIPMENT

insure uniformity and strength!

Controlled uniformity and high bonding strength of core oils contribute to efficiency in performance and economy in castings operations.

Foundrymen have found that Velsicol core oils possess these essential properties: *clean workability, high bonding strength, to low gas evolution, accelerated baking properties, and rapid* core *collapsibility.* Rigid laboratory control insures product uniformity.

Velsicol core oils can be used for iron, steel, and non ferrous metal castings. Samples and technical information furnished on request.

Your own tests will convince you that Velsicol core oils can improve your casting production.

VELSICOL CORPORATION

330 EAST GRAND AVENUE, CHICAGO, ILLINOIS • REPRESENTATIVES IN PRINCIPAL CITIES

BETTER CASTINGS...DIRECT SAVINGS quickly pay for COLEMAN core and mold OVENS

● **REDUCE YOUR OPERATING COSTS** by replacing obsolete, inefficient core and mold ovens with Coleman Ovens. Why waste money using worn-out ovens? Install Coleman Ovens which quickly pay for themselves through immediate direct savings—savings which start in the core room and molding department and end up with perfect castings! It will pay you to investigate Coleman Ovens today because of these vitally important cost-saving advantages:

DEPENDABLE BAKING AND DRYING. All guesswork in core baking and mold drying removed. Rejects and make-overs eliminated.

INCREASED LABOR SAVING. Efficient and modern mechanical designs reduce handling and other indirect labor to a minimum.

HEAVY DUTY CONSTRUCTION. Responsible for dependable performance, economical operation, and minimum maintenance cost.

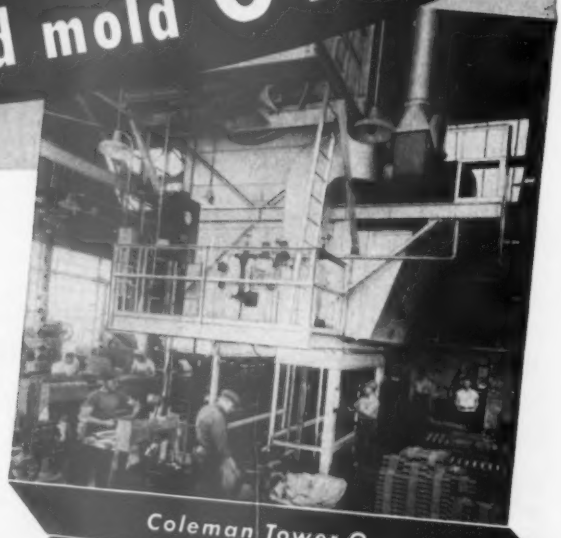
MAXIMUM FUEL ECONOMY. Coleman Heating Systems use the most economical fuel available to you—gas, oil, stoker-coal, electricity, etc.

BETTER WORKING CONDITIONS. Positive ventilation built into Coleman Ovens prevents leakage of fumes and gases—helps to make the core department a better place to work.

COMPLETE RANGE OF TYPES AND SIZES to meet every need.

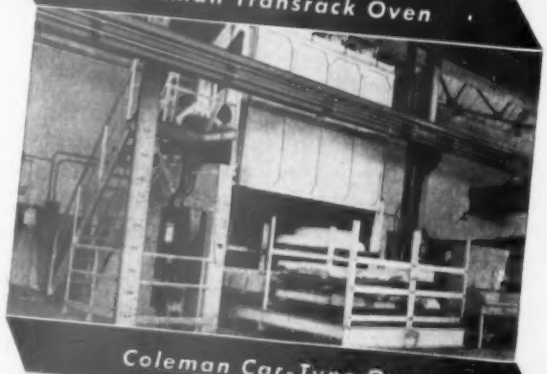
ADVANCED OVEN KNOW-HOW. Coleman Engineers have pioneered and developed the most efficient foundry oven designs. We will gladly study your operating conditions and recommend the type of Coleman Oven that will do your work at the lowest cost for fuel and labor.

Write today for Bulletin 48



Coleman Tower Oven

Coleman Transrack Oven



Coleman Car-Type Oven

Coleman Rolling Drawer Oven

THE FOUNDRY EQUIPMENT COMPANY

1831 COLUMBUS ROAD CLEVELAND 13, OHIO

World's Oldest and Largest Foundry Oven Specialists

OVER 10,000 SUCCESSFUL INSTALLATIONS

A note on Abrasives

Improved Abrasive Tools help step up production...cut costs

New production efficiencies and economies are being realized almost daily as a direct result of technical advances in abrasive products. At The Carborundum Company these improvements do not just "happen." They are derived from a carefully formulated program. Product Development ... an important activity here... pools specialized knowledge, experience and skill. It probes into the performance of present products... seeks and finds possibilities for doing the job better. It examines and compares the action of bonded and coated products under every conceivable production condition. It studies and restudies technical advances in machines and methods. CARBORUNDUM'S development staff turns up ideas that can be incorporated into new products as well as better ways of using present products. Both are important to production management. As a user of abrasive products by CARBORUNDUM, you receive the direct benefit of all advances in product development. This —together with abrasive engineering and other services—offers another reason for specifying and buying abrasive tools produced by CARBORUNDUM ... the leading name in abrasives. The Carborundum Company, Niagara Falls, New York.

The only complete line of Abrasive Tools is

CARBORUNDUM

TRADE MARK

"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company

Engineering News
ON ABRASIVE PRODUCTS

Belt Backstand Idler Techniques Effect Operating Cost Reduction

Substantially increased output, lower unit costs and improved finishes are influencing more metal working plants to switch to belt backstand idlers for grinding and finishing flat and contoured surfaces of both small and medium weight pieces. In many factories where set-up wheels were formerly used, conversion from 25 to 100% to the backstand technique has been effected. While these methods normally involve grinding speeds of 6500 to 7000 SFPM with glue-bonded abrasive cloth belts, speeds of 10,000 SFPM are being used widely today with resin bonded belts.

As a result of recent wide-spread experiences with belt backstand idler techniques, our trained staff of engineers is equipped to guide users in making the best use of this equipment. In all cases they are able to recommend applications and abrasive materials to meet your requirements.

Better Work with Cylindrical and Crankshaft Grinding

Cylindrical grinding wheels including crankshaft wheels by CARBORUNDUM are engineered to provide the tools required for maintenance of efficient production rates, rapid stock removal and fine surface finish.

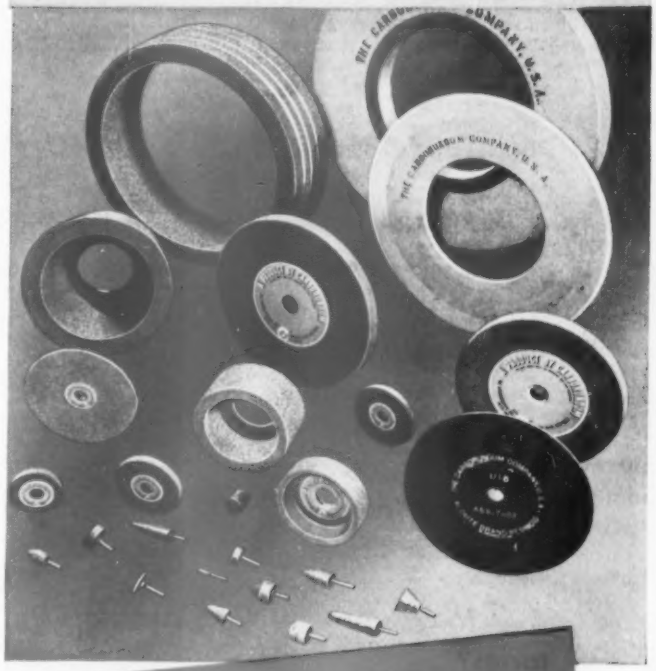
V11 bond represents the most recent contribution to this class of grinding. These wheels are designed with a *specific structural balance* which when combined with the proper grain size and abrasive type offers the following advantages to both operator and management:

1. Cool and free cutting characteristics promote more efficient production of superior finishes and close tolerances. This is of great importance in operations involving both OD and shoulder or face grinding.
2. Designed structural balance permits continuous fast cutting rates which promote high production.
3. Fast cutting qualities combined with long life save dollars in operator and machine time as well as abrasive costs.
4. Engineered uniformity of the abrasive and bond components of these wheels permits close control of part size and form.
5. Self dressing characteristics provide longer periods of use between dressings . . . save dressing time, usable abrasive and dressing tools.
6. Ability to grind a wide range of materials makes possible savings in inventories of special wheels and minimizes requirements for premium priced abrasives.
7. Savings in set-up time are made possible because the versatility of V11 bond wheels permits efficient grinding of many varieties of work, making it unnecessary to change wheels when changing from one job to another.

For prompt attention to abrasive problems, call your nearest branch office of The Carborundum Company.

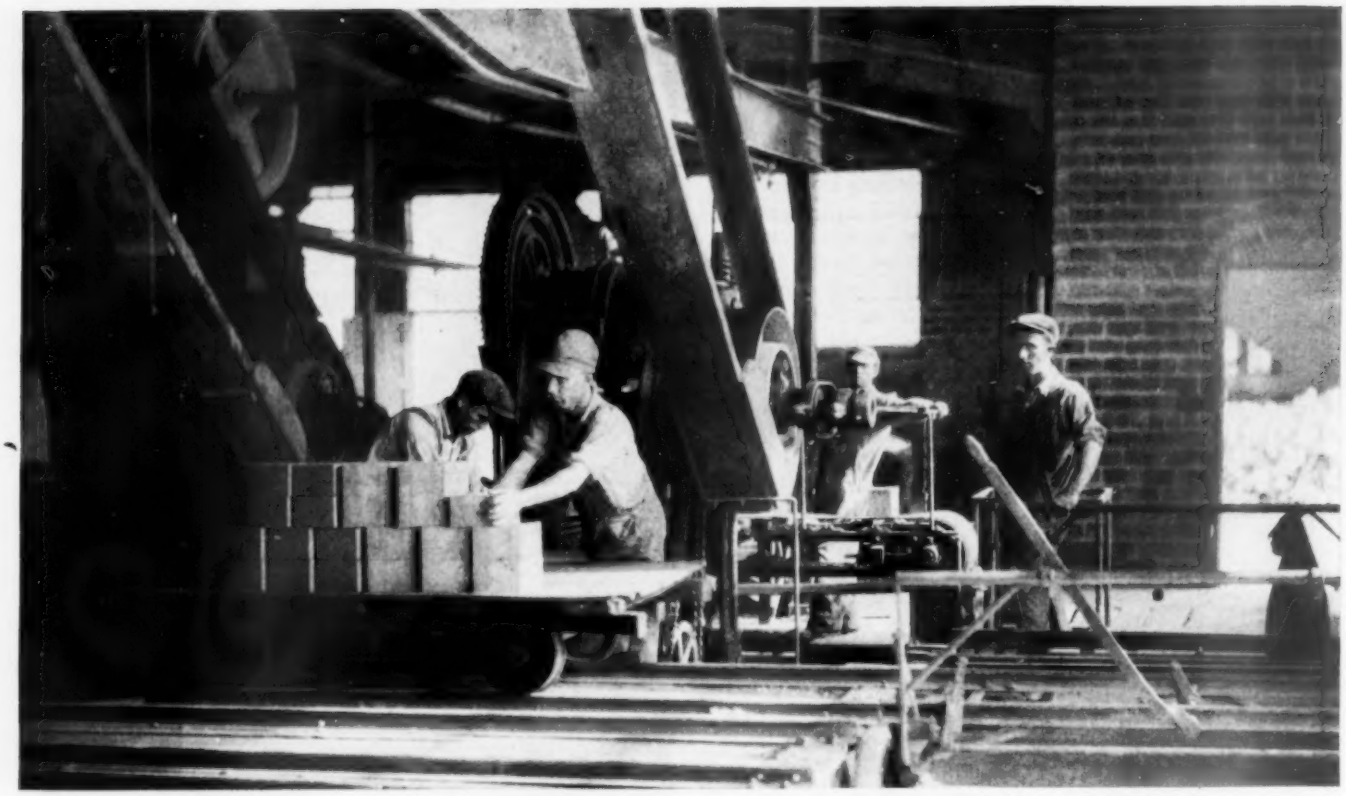
COATED PRODUCTS — SHEETS • ROLLS • BELTS • DISCS SPECIAL SHAPES

BONDED PRODUCTS — ABRASIVE WHEELS • STICKS, STONES AND RUBS • SPECIALTIES • SUPERFINISHING STONES • SPECIAL FORMS • ABRASIVE GRAINS AND FINISHING COMPOUNDS



FOR EVERY ABRASIVE APPLICATION
. . . CALL IN
CARBORUNDUM
TRADE MARK

REFRACTORIES



Pressing Machine Made Cupola Blocks

"Ironton" has long been known as one of the top producers of cupola refractories. As a pioneer in the manufacture of hard, dense, cupola blocks, we have enabled many foundrymen in this country and Canada to obtain longer life from their cupola linings.

In addition to quality of product, we offer you technical assistance in solving your refractory problems. Our objective is to render efficient, friendly service in prolonging the life of your refractories and to help you secure better castings at the lowest possible refractory cost.

May we send you complete information on "Ironton" foundry refractories?

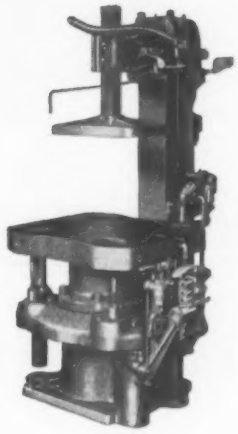
THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO

"I See BIGGER Profits for your Foundry in 1950"

The foundry industry has always staged a comeback, and it will do it again in 1950. Production will be stepped up to much higher levels and foundrymen who had the foresight to install modern, high-speed equipment will enjoy bigger profits. Now is an excellent time to check your equipment. Is it modern? Will it meet the "acid test" when peak production schedules are again put into effect? Investigate modern MILWAUKEE machines—high speed Molders, Core Blowers and Core Grinders. Without any obligation on your part, we'll gladly send you descriptive literature.

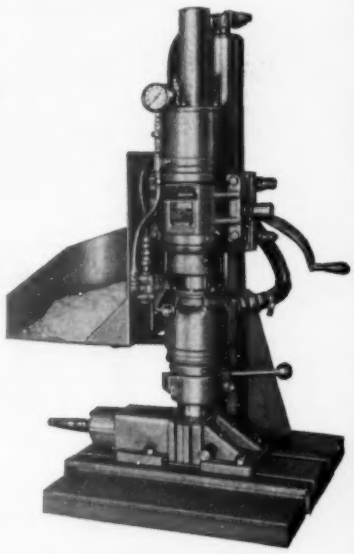


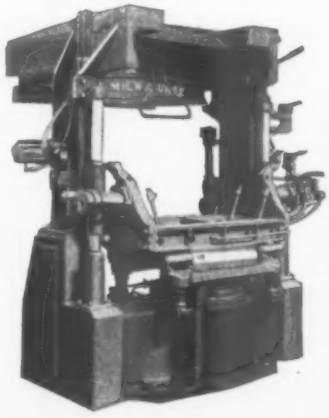
MILWAUKEE
Jolt Squeeze Pin Stripper

Ideal for simple, short run, fast production jobs. Convenient control valves and constant parallelism between pattern table and platen. Drawing mechanism operated on exhaust of squeezing stroke as a stripper or a separate operation after squeezing as a pin lift. Operates as pin stripper, pin lift or as a jolt squeezer. Available in five sizes.

MILWAUKEE-TACCONE
Core Blower

Both bench style and draw type models available. Blow intricate cores up to 12 lbs. in size. Explosion-like action. Synchronized clamping and blowing increase speed and efficiency. Blown cores automatically released. Can be removed as fast as blown. Completely equipped with blowheads and clamp, ready to operate. Ask for literature.





MILWAUKEE
Jolt Squeeze Rollover Draw

A fast molder with automatic leveling and smooth pattern draw. Combines jolt, squeeze, rollover and pattern draw in the simplest possible operating cycle. Assures powerful, accurate, precision performance under continuous, difficult conditions. This model has an 1800 lb. jolting and 50000 lb. squeezing capacity at 80 lbs. line pressure. Handles flasks 47" wide.

MILWAUKEE
Core Grinder

Rotary Table Model with 30" grinding wheel, for continuous or intermittent grinding. Dual Table style with 42" grinding wheel, also available.

In order to render a better service to our customers, we are pleased to announce the consolidation of Milwaukee Foundry Equipment Co. with SPO Inc.

ORE BLOWERS • CORE GRINDERS • MOLDING MACHINES • BRIQUETTING PRESSES

MILWAUKEE *Foundry Equipment*

Division of SPO Inc.

3236 W. PIERCE STREET, MILWAUKEE 15, WISCONSIN, U. S. A.

* adds to the *Extra Value* in

CHATEAUGAY PIG IRON

Between rough casting and finished lathe chuck, the machining operations are many and varied—calling for the highest possible machinability factor. That's why one of our largest chuck manufacturers insists upon the use of Republic CHATEAUGAY Pig Iron in his foundry.

This low-phosphorus, copper-free iron stands way out front on other points, too: *consistently uniform "physicals" held within narrow predetermined limits . . . uniformly fine grain structure . . . fast-flowing and even-cooling characteristics . . . wear-resisting surfaces . . . high impact value.*

A Republic Pig Iron Metallurgist will be glad to show you how CHATEAUGAY consistently out-performs other pig irons. Write, wire, or phone *today.*

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic **PIG IRON**

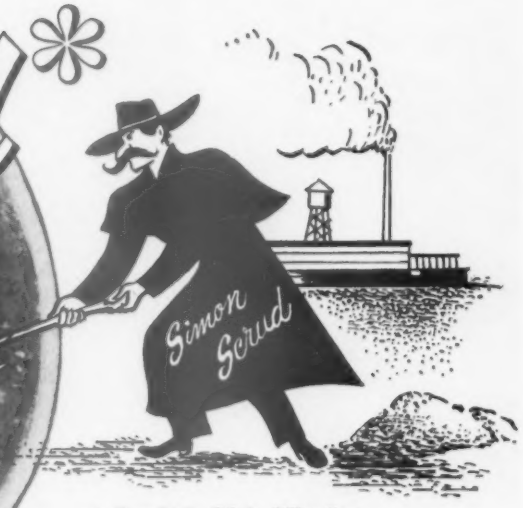
"CHATEAUGAY" Low-Phosphorus, Copper-Free

"REPUBLIC" (Northern) Foundry, Basic and Malleable

"PIONEER" (Southern) Foundry and Basic

REPUBLIC STEEL

Is Scrud* a problem in your plant?



* *Scrud: the SCale, RUst, Dirt, water, oil and other foreign matter in pipe lines.*

● Scrud—a word coined to describe the damaging foreign matter nearly always present in pipe lines—can be eliminated completely. Staynew Pipe Line Filters are the answer.

These money and trouble-saving filters include many exclusive features that mean better performance at lower cost wherever pipe lines must deliver clean air, gases or liquids. Tools, machines and processes require less attention, operate more efficiently when Staynew Filter-protected. It is not unusual for a Staynew Filter to save its entire purchase price in a few days of use.

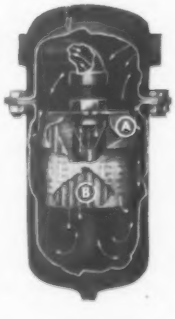
STAYNEW filters

...FOR AIR AND OTHER GASES

Model CPHS
Swing Bolt Head

DOUBLE ACTION PRINCIPLE GUARANTEES BOTH CLEAN AND DRY AIR OR GAS

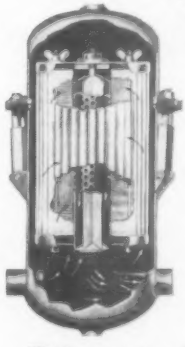
Model CPH
Bolted Head



Deflector Cup "A" directs air or gas to walls of housing, thence to base where heavier particles and liquids are deposited. Air or gas then rises thru Radial Fin Insert "B" where lighter particles are removed.

Models for high pressure; also high temperature or corrosive gases.

Write today for complete data, mentioning special interests.



...FOR LIQUIDS

Model ELS
Small Capacity

Model ELS
Large Capacity

Wide variety of media available. Low first cost, also low maintenance due to Slip-On Insert which permits quick on-the-job change or replacement of medium. Models available for high temperature or corrosive liquids.

RADIAL FIN CONSTRUCTION PROVIDES:

★ Large active filtering area in small space, thus low resistance to flow.

★ Inserts easily removed for cleaning or replacement.

★ Superior wearing quality.

DOLLINGER PROTECTOMOTOR STAYNEW FILTERS

DOLLINGER CORPORATION • 36 Centre Pk., Rochester 3, N.Y.

Photo by Toby Chadwick

Profitable New Product Invented by Foundry...

A sound idea, engineering skill, and the *right* Federated metals for its cast components are combined in the LITTCO ELECTRIC MOWER, manufactured by the Littlestown Hardware and Foundry Company, Inc., Littlestown, Pa.

Competent design and liberal use of castings made of Federated aluminum alloys have resulted in the production of a 24 lb. electric lawn mower which, although it requires only one hand to operate, will cut grass up to 15 inches high with no trouble.

Eighteen parts of the mower, including the sides, the housing, wheels, back rollers and brackets, are cast of Federated TENZALOY and Federated F-720, the former being used where extra high strength is demanded.

TENZALOY is produced only by Federated Metals. It is an aluminum alloy which gives high strength without heat treatment, as-cast strengths reaching 30,000 psi., and still higher with 10-14 days aging at room temperature.

For TENZALOY . . . for any non-ferrous alloy, including aluminum, magnesium and copper-base foundry metals; solders; bearing metals; and fabricated lead products . . . see Federated first.

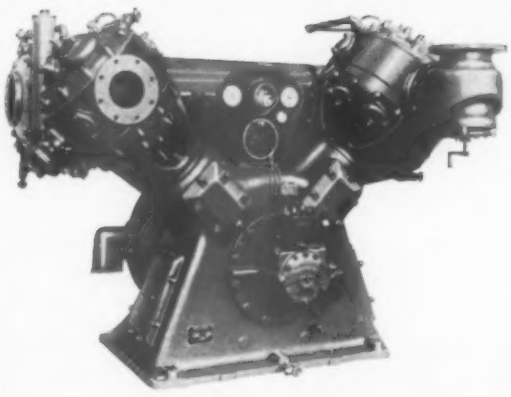
Federated first in the non-ferrous field FMD

Federated METALS DIVISION

AMERICAN SMELTING AND REFINING COMPANY, 120 BROADWAY, NEW YORK 5, N.Y.

Here's a
RUGGED HEAVY-DUTY MACHINE
that supplies large air volumes with
GREATEST EFFICIENCY!

JOY WN-114 AIR COMPRESSOR



The JOY WN-112 is a two-cylinder, heavy-duty, continuous type unit, having all the features of the WN-114. It delivers 368 to 1828 CFM, up to 3656 CFM in twin units.

Check these Features:

- Delivers 1092 to 3656 CFM, up to 7312 CFM in twin units
- Four Cylinders, two stage, double acting, water cooled
- Requires less room, costs less to install
- Exclusive Dual Cushion Valves are more efficient, have longer service life
- Exclusive Load Control assures lower operating costs
- Simpler design—Longer life—Less maintenance

WRITE FOR BULLETINS, OR

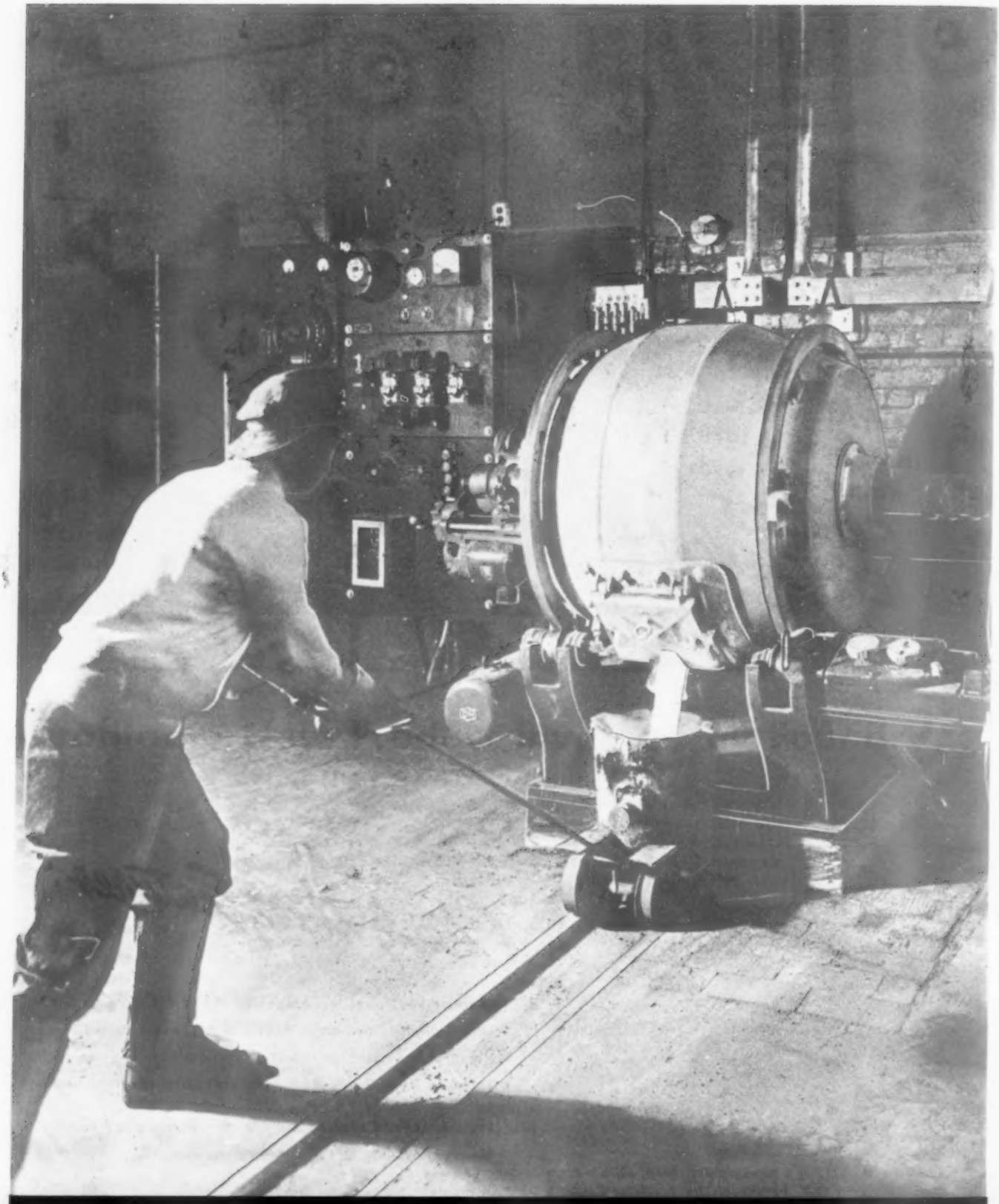
Consult a Joy Engineer

W&D 12827

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

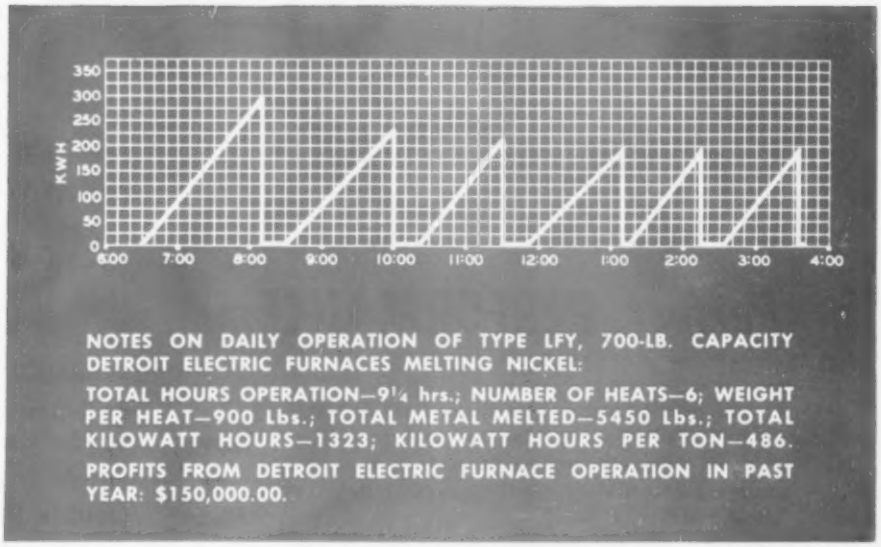
IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO



Low MELTING COST *High* QUALITY CONTROL
FOR FERROUS *and* NON-FERROUS METALS

$150,000 PROFITS

FROM ONE YEAR OF DETROIT ROCKING ELECTRIC FURNACE OPERATION



NOTES ON DAILY OPERATION OF TYPE LFY, 700-LB. CAPACITY DETROIT ELECTRIC FURNACES MELTING NICKEL:

TOTAL HOURS OPERATION—9¼ hrs.; NUMBER OF HEATS—6; WEIGHT PER HEAT—900 Lbs.; TOTAL METAL MELTED—5450 Lbs.; TOTAL KILOWATT HOURS—1323; KILOWATT HOURS PER TON—486.

PROFITS FROM DETROIT ELECTRIC FURNACE OPERATION IN PAST YEAR: $150,000.00.

A large automotive plant did it! Actually racked up $150,000 profits on Detroit Rocking Electric Furnaces in a year's operation.

The same operating advantages that set this outstanding record will work for you, too, when you put Detroit Rocking Electric Furnaces on your metal melting operations.

What Rocking Does

The rocking action of Detroit Electric Furnaces contributes heavily to superior performance. Electrodes remain clear of the molten bath at all times, eliminating the possibility of carbon pickup. The rocking movement stirs the bath constantly and assures complete homogeneity of the melt. It aids efficiency, too, because the metal picks up additional heat as it washes over the refractory lining.

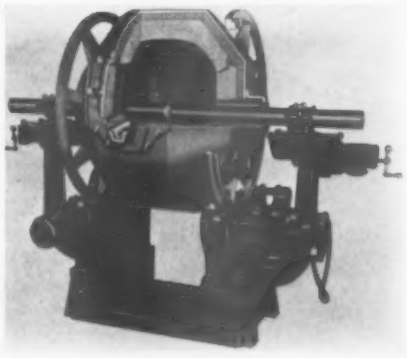
Profit-Producers

More heats per day because of faster melting speed, easier handling, positive control, minimum out-of-production time.

Maximum uniformity of product assures better quality of castings, higher usable yield per melt, fewer rejected castings.

Detroit Rocking Electric Furnaces achieve lowest metal loss by shrinkage, convert shop borings and turnings with least loss from oxidation.

Optimum power use makes for melting economy, and all-electric operation cancels the need for costly handling and storage of bulky fuels.



Full Range of Capacities

Detroit Electric Furnaces are available in capacities from 10 to 4000 lbs with either conical or cylindrical chambers. Furnaces are individually designed to meet your plant electrical specifications.

Get the Facts!

If you melt ferrous or non-ferrous metals, get the details on Detroit Rocking Electric Furnaces. Send us your production data and our engineers will furnish facts on high operating economy, positive quality control and other advantages *for you* in the Detroit Rocking Electric Furnace suited to your needs. Write to

DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN

Foreign Representatives: In BRAZIL—Equipamentos Industrias "Eisa" Ltd., Sao Paulo, CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y.; MEXICO: Casco, S. de R. L. Atenas 32, Despacho 14, Mexico City, D. F.

THE BIG SWING IS TO

UNITED STATES
SWING FRAME GRINDER

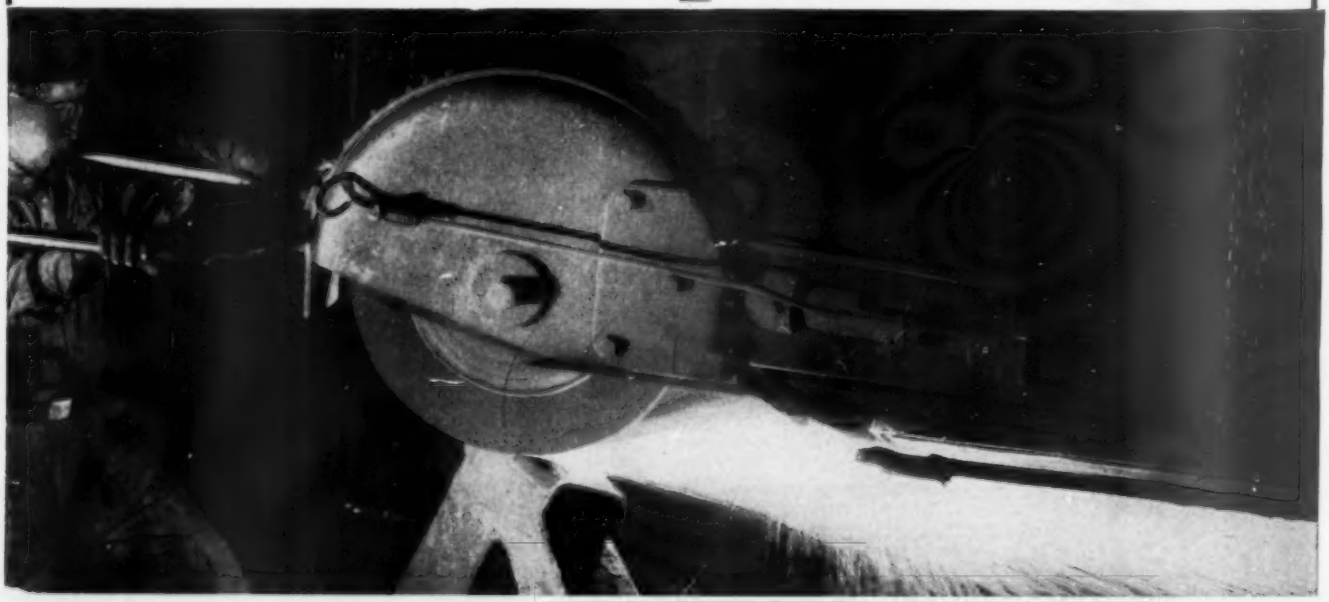
***Perfect* BALANCE**
***Perfect* VISIBILITY**
***Perfect* PERFORMANCE**

From any angle. . .45° right to 80° left. . . perfect visibility and perfect balance. . .and just as efficient on horizontal grinding, of course. Furnished with guards, belts and attachments.

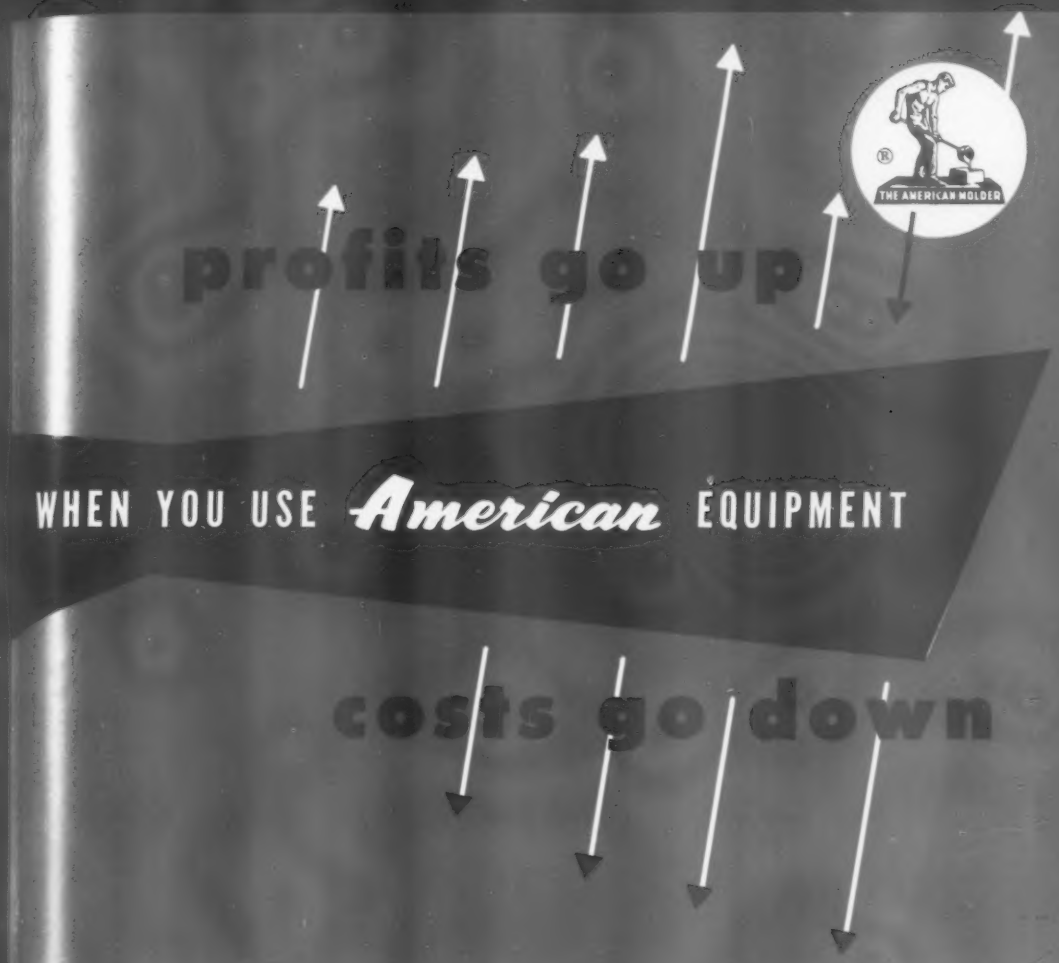
CONTACT YOUR DISTRIBUTOR OR WRITE DIRECT

- Anti-Friction Bearings Throughout
- Perfect Balance
- Perfect Visibility
- 2-Speed-V-Belt Drive
- For 16″ 20″ and 24″
- High Speed Wheels
- Guards of Boiler Plate Steel
- Wheels Changed Easily and Quickly
- Ball-Bearing Totally Enclosed, Fan Cooled Motor
- Single Suspension At Center
- Double Suspension At Wheel Head and Motor End

Check these features and you'll see why you need this grinder in your plant



The UNITED STATES ELECTRICAL TOOL *Co.*
CINCINNATI, OHIO



A man once said "Our best asset is the obsolete equipment our competitors use." AMERICAN products provide a bigger, faster investment return, and give you a keen edge for the competitive battle by helping you to produce better, easier-to-sell products at lower costs. These savings have been proven by foundry executives all over the country. Perhaps you should be making these savings too!

TRU-STEEL Shot

cuts abrasive and maintenance costs

A tool manufacturer in Ohio* actually saves 62% of his previous cost of shot and machine parts by using TRU-STEEL instead of chilled iron. Here is the comparison.

TRU-STEEL shot is a genuine true steel that has received a full heat treatment—not just a draw, or anneal. It is round and solid, hard and tough, accurately graded and controlled as to quality and hardness. It lasts much longer; reduces maintenance costs; increases life of machine parts; saves on transportation and storage; and reduces cleaning costs per ton. Investigate TRU-STEEL savings today. Write for Bulletin No. 59.

COST COMPARISON CHART

TYPE OF SHOT	CHILLED IRON	TRU-STEEL
SHOT USED IN 80 WHEEL HOURS	1950 lbs. (24.4 lbs. per wheel hour)	400 lbs. (5 lbs. per wheel hour)
COST OF SHOT	$87.00	$45.00
COST OF PARTS	$52.65	$ 6.80
TOTAL COST	$139.65	$51.80
SAVINGS	(80 wheel hours) $87.85	

* *Name on request.*

American WHEELABRATOR & EQUIPMENT CORP.
505 S. BYRKIT ST. MISHAWAKA 2, INDIANA

PLEASE TURN PAGE

AT THE MAJESTIC CO.,

WHEELABRATOR® Saves $9,525 per year

	FORMER METHOD	WHEELABRATOR METHOD
MACHINE	8 tumbling mills	66" Wheelabrator Swing Table
PRODUCTION	125 tons per month	125 tons per month
LABOR	2 men at 9 hours each 18 man hours daily	1 man at 8 hours — 8 man hours daily
CLEANING COST	Per Ton — $13.29	Per Ton — $6.94

SAVINGS

per ton
$ 6.35
per month
$ 793.75
per year
$ 9525.00

Gray iron castings—125 tons per month—ranging in weight from a few ounces up to 400 pounds are cleaned in Majestic's foundry for use in their building specialties such as coal chutes, indoor and outdoor fireplaces, incinerators, etc., as well as for their complete line of heating equipment.

Since the Wheelabrator Swing Table was installed the bulk of their production changed from large, heavy furnace work to thousands of small, relatively fragile pieces. According to Mr. Claude Morgan, Plant Supt., it would have been impossible to operate the foundry profitably without the Wheelabrator Swing Table—breakage would have been prohibitive and labor costs excessive.

Costs go down — profits go up, when you use Wheelabrator. Write today for information on how you, too, can use a Wheelabrator, the amazing airless blast machine that pays for itself.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

THE AMERICAN WHEELABRATOR & EQUIPMENT CORPORATION

American

Huntington, Indiana

DUSTUBE

Increases Production..

..Cuts Insurance Rates..

..Improves Working Conditions

See what these officials at Majestic say:

Mr. Claude Morgan, Plant Superintendent

"Equipment we purchase is ordinarily installed for a specific purpose and it usually performs satisfactorily. The performance of our Dustube Dust Collector which ventilates all operations in our cleaning room, however, provides many important benefits: (1) Eliminates a severe dust condition: (2) Provides employee comfort and increases production through better working conditions: (3) Decreased insurance rates: (4) Reduces cost of housekeeping by preventing dust to escape into the atmosphere. The other advantages can be lumped into this statement that 'the Dustube more than pays its own way.' "

Mr. C. L. McWhorter, Foundry Foreman

"The performance of the Dustube has been so outstandingly satisfactory that I must admit its continual high efficiency and low cost operation is taken for granted. If we had some trouble occasionally, the benefits would be more apparent and appreciated. Naturally, we're proud of the dust-free conditions in our cleaning and grinding room which means so much in making the foundry a good place to work."

Mr. Geo. Shutt, Maintenance Foreman

"We have had absolutely no trouble with the Dustube whatsoever — no new parts have been required in nearly two years of steady operation. Inspections made monthly reveal that there is no cloth wear and we should get many, many more years of trouble-free operation from the unit. All the working parts are readily accessible which makes possible quick, positive inspection and necessary lubrication."

On-the-job performance proves that Dustubes meet the most exacting requirements for simplicity, economy and efficiency. This is a combination that pays off in dollars as well as improved working conditions. To find out how a DUSTUBE can make money for you, have an AMERICAN representative call at your convenience.

DUSTUBE ADVANTAGES

BETTER DUST REMOVAL — Simple, fast, thorough. Shortens cleaning time.

POWER SAVINGS — Lower resistance to air flow. Lower air velocities.

HIGH EFFICIENCY — Nearly 100% efficient by convincing tests.

EASE OF INSPECTION — Clean, safe, simple. No parts to remove.

DUSTUBE FILTERS — No abrading metal contact. Easy to ship, store and handle.

FILTER REPLACEMENT — Takes only a few seconds. Requires no tools.

HEELABRATOR & EQUIPMENT CORP.

155 S. Byrkit Street Mishawaka 2, Indiana

PLEASE TURN PAGE

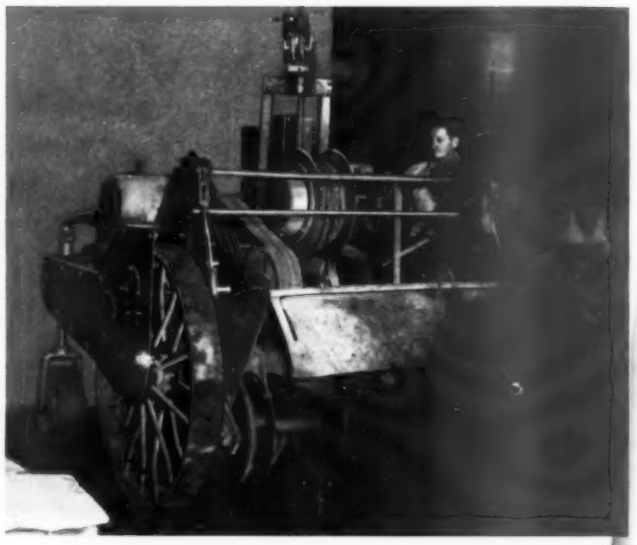
American SANDCUTTER

cuts cost 70%

saves $3363.41 in one year

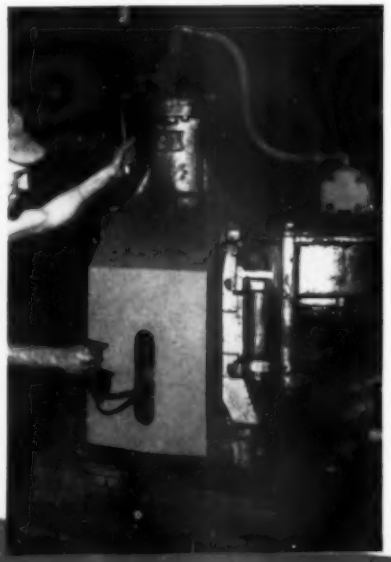
Before installing a Model "AM" Sandcutter, Kline Hardware Co. of Allentown, Pa. spent $4838.36 on sand cutting. After installation, the cost was reduced to $1474.95 a reduction of 70%.

SANDCUTTER reduces the cost of sand conditioning because it is faster and requires less labor . . . no hand shovelling. The whirling blades churn through dry spots, wet spots, lumps and pockets . . . blend sand to peak condition for fast, economical molding. Write today for complete information on how you can have better sand, and better castings, at lower cost — with a SANDCUTTER.



American CORE ROD STRAIGHTENER

saves $12,000 in one year



In one foundry* two AMERICAN ROD STRAIGHTENERS replaced nine men required to straighten core rods by hand, saving over $12,000 in a single year. Another foundry reports their investment was returned 2½ times in one year on labor savings alone. If core rod costs are a problem because of costly hand straightening or excessive purchases of new stock this machine will return you a nice profit. An attachment for making gaggers is optional. Write today for Bulletin No. 10-B.

*Name on request.

American

WHEELABRATOR & EQUIPMENT CORP. 505 S. Byrkit St., Mishawaka, Indiana

Advertisement

ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Division, Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

CHROMIUM...key metal for strength, corrosion resistance, and heat resistance

Chromium is one of the most important alloying elements in iron and steel metallurgy since it markedly improves certain chemical and physical properties.

Increases Strength

The strength of steels is greatly increased by chromium because it retards the transformation of certain constituents during rapid cooling.

This makes it possible to obtain great depth of hardness in high-carbon steels, toughness in structural steel, and high strength and ductility in heavy sections. Chromium also increases resistance to shock by refining the grain of the steel.

Of all the alloying elements, chromium is probably the least expensive for increasing the tensile strength of steel. Additions of as little as 0.25 to 1.25 per cent chromium will increase the chill and hardness

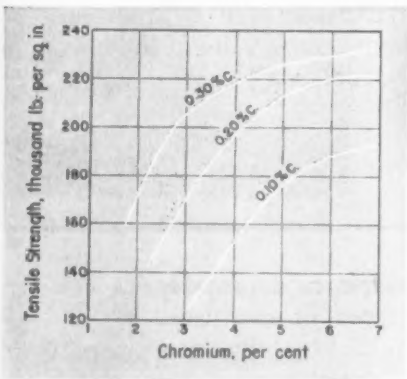


Fig. 1. Chromium increases the tensile strength of air-cooled steels of varying carbon content.

of the steel, as well as the tensile strength.

In copper, aluminum, and other non-ferrous alloys, chromium provides increased strength, also.

Imparts Corrosion Resistance

Commercially, chromium is added to steel and iron in amounts up to 30 per cent for the purpose of improving corrosion resistance.

In general, as the chromium content is increased with a given carbon content, the resistance of the steel to corrosive media becomes greater. The well-known "stainless" steels resist corrosion because substantial percentages (usually 12 per cent or more) of chromium are present.

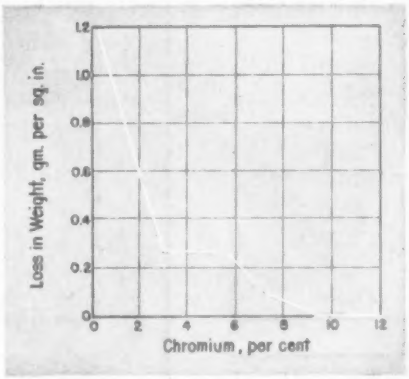


Fig. 2. Results of atmospheric corrosion tests on low-carbon steels of different chromium contents after 10 years of exposure to an industrial atmosphere.

Improves Heat Resistance

In both cast iron and steel, chromium provides good resistance to deterioration from heat. The use of chromium-alloyed iron and steel where high temperatures are encountered, for example, helps to prevent oxidation, which would ruin equipment. As little as 1 to 2 per cent chromium is added to cast iron to improve oxidation resistance and reduce growth of grate bars subject to high temperatures. Oxidation resistance improves progressively as the chromium is increased. Steels containing as little as 5 per cent chromium show good life at temperatures up to 1200 deg. F. For higher temperatures, appropriate steels of higher chromium content may be selected. Steels containing 25 to 28 per cent chromium give satisfactory service at temperatures up to 2100 deg. F.

Alloy cast irons with 15 to 30 per cent chromium are commonly used for applications requiring resistance to severe heat and abrasion.

In non-ferrous alloys, also, chromium is an important constituent for heat and corrosion resistance. It is used in the production of non-ferrous metal-cutting tools, chromium bronzes, and electrical resistance alloys.

Available Alloys

Chromium is produced by ELECTROMET in the forms listed below which are suitable for every use of the iron, steel, and non-ferrous metal industry.

"CMSZ," "EM," "Electromet," and "SM" are trademarks of Union Carbide and Carbon Corporation.

Alloys of Chromium and Their Uses

Low-Carbon Ferrochrome	For production of corrosion- and heat-resistant steels, commonly known as the "stainless steels," as well as special high-temperature alloys in which a low carbon content is desirable.
High-Carbon Ferrochrome	For production of chromium-bearing steels that do not require low percentages of carbon. Also used for adding chromium to cast iron.
Nitrogen-Bearing Ferrochrome	For reducing grain size and improving physical properties of high-chromium steels.
Ferrochrome-Silicon	Used in the production of stainless steels for adding chromium to the bath, and for reducing oxidized metals in the slag back into the bath.
Ferrosilicon-Chrome	Readily soluble material for making either furnace or ladle additions of chromium to steels.
"SM" Ferrochrome	Readily soluble material for making chromium additions to steel or cast iron in either the furnace or the ladle.
Foundry Ferrochrome	Especially for use in making ladle additions of chromium to cast iron.
"CMSZ" Mix	Combination hardening and graphitizing mixture for use as a ladle addition in making high-strength cast iron having good machinability.
Chromium Metal	For use in non-ferrous chromium-bearing alloys, such as electrical resistance alloys, high-temperature and corrosion-resistant alloys, metal-cutting tools, chromium bronzes, and certain high-strength aluminum alloys.
Electrolytic Chromium Metal	Contains a minimum of 99 per cent chromium. For use in the production of non-ferrous alloys, where even small amounts of impurities would be objectionable.
"EM" Chromium Briquets	For adding chromium to cast iron in the cupola.

4 REASONS WHY

FERROCARBO Briquettes help produce top quality Cast Iron

1

MORE EFFECTIVE DEOXIDATION

Readily soluble in molten iron, the components of FERROCARBO briquettes provide powerful deoxidation. Oxides are reduced and eliminated. Super-heated iron of greater fluidity is obtained. Foundry operating variables are reduced. Cleaner, sharper castings are poured.

2

IMPROVED STRUCTURE

Irons which have been deoxidized with FERROCARBO briquettes are characterized by a dense, close-grained structure, free from chill or porous areas even though varying widely in metal section. Segregation is eliminated.

3

SUPERIOR MECHANICAL PROPERTIES

The use of FERROCARBO briquettes insures iron structure with higher physical values.

4

PROLONGED TOOL LIFE

Iron which is deoxidized with FERROCARBO briquettes promotes longer life of the machine tools.

CUPOLA addition of FERROCARBO silicon carbide briquettes to a properly adjusted charge greatly lengthens the useful life of all types of cast iron. For metallurgical advice on their use in your operation write Bonded Products and Abrasive Grain Division, Niagara Falls, New York.

FERROCARBO Briquettes

BY CARBORUNDUM

TRADE MARK

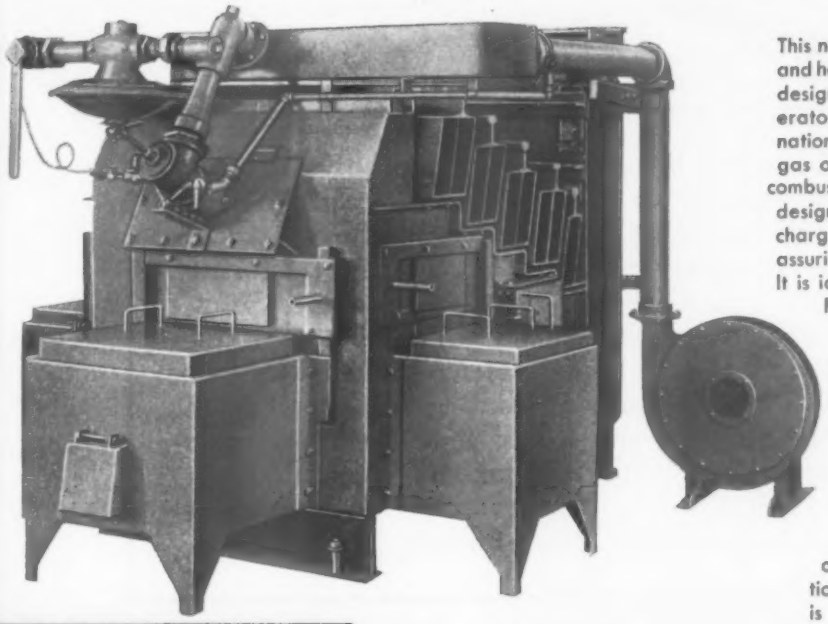
THE CARBORUNDUM COMPANY, Bonded Products and Abrasive Grain Division, Niagara Falls, New York

FERROCARBO Distributors: Kerchner, Marshall & Co., Pittsburgh, Cleveland, Birmingham, Philadelphia and Buffalo; Miller and Company, Chicago, St. Louis and Cincinnati

"Carborundum" and "Ferrocarbo" are registered trademarks which indicate manufacture by The Carborundum Company

ATTENTION ALUMINUM MELTERS!

Here's the NEW Stroman Model MC Aluminum Reverberatory Dip-Out Furnace



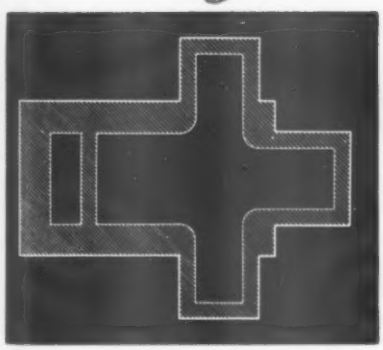
This newest of Stroman Furnaces is a combination of breakdown and holding furnaces. It's two in one ... and the most economic ever designed for aluminum melting. The MC Furnace is of the reverberatory type. It can be fired by either gas or oil or with combination burners, so that it is a simple matter to switch from oil to gas or vice-versa. Fuel costs are reduced to unheard of lows, combustion which is generally exhausted in ordinary furnace designs, is used in this furnace to pre-heat and melt the metal charge. No cold metal reaches the bath of molten aluminum, assuring fastest melting and uniform temperature of bath.

It is ideal for Die Casting, Permanent Mold and Sand Casting Plants. It is the zenith of speedy, efficient operation. Hot metal is ALWAYS available for dipping. Built to accommodate 500 to 4000 lbs. metal bath, the dip-out boxes are placed around the furnace so that three to six die casting or permanent mold stations may be easily operated with a single MC Furnace.

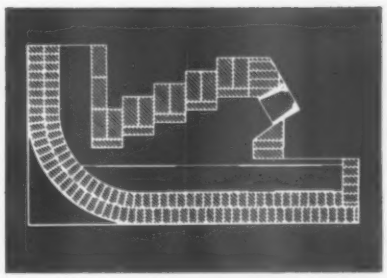
The Model MC brings "Good Housekeeping" to your plant. For returns, gates, risers, may be immemediately returned to the hopper with the ingot ... Creates Ideal Working Conditions, for furnace radiates very little heat ... Lowest Maintenance, no iron pots or crucibles to replace, no breakdowns ... Minimum formation of dross ... Finest quality castings, every time ... Furnace is delivered as complete unit, ready to melt. Complete Automatic Controls available if desired.

Compare floor space required for one Stroman Model MC to three breakdown and three holding furnaces to supply the same amount of molten metal. A tremendous saving in square feet, as well as man hours and metal saved in transfering from breakdown to holding.

Cut your aluminum melting costs to the bone ... Let Stroman Engineers show you how this great production furnace will fit into your plant and boost profits to new highs. Write today for full information and specification. Do it NOW.

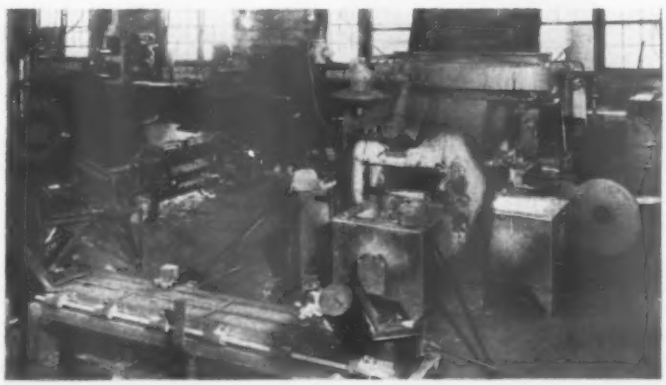


Horizontal View Showing 3 Dip-Out Boxes

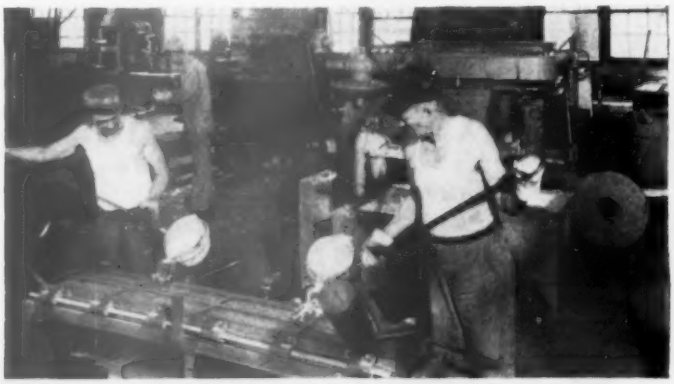


Vertical View Showing Combustion Chamber, Metal Bath and Charging Hopper.

Stroman Model MC Furnace illustrated has a 3000 lb. Metal Bath.



Small floor space still allows up to six men to work with ample elbow room.



STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

DO YOU OPERATE A CORE BLOWER?

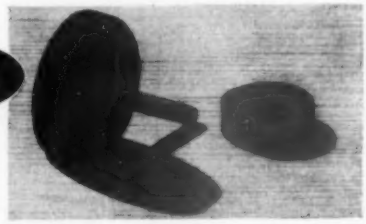
THEN YOU NEED DURA LONGER WEARING PRODUCTS

Dura is a resilient plastic which gives longer service for blow tubes, wear inserts in core boxes and like applications. Chief advantages: it (1) outlasts metal 10 to 20 times; (2) resists oil, acid and alkalis; (3) is resilient, non-hardening, non-swelling; (4) can be cemented firmly to metal, and (5) can be replaced in the foundry without sending the core box to the pattern shop. The four Dura products mentioned below cost far less in use than the corresponding metal items. Write for our well illustrated 8-page Bulletin "A".

DURATUBES

Duratubes **pinch off sand tips,** eliminating distortion and hand filing of complex cores; cut production losses in the changing of bushings; seal effectively against air leakage between box and blow plate. They often cost less to buy than special metal tubes; they regularly stand up 10-20 times as long.

DURABUTTON



Durabutton is a plastic wear insert for core boxes which lowers replacement time and increases production; reduces wear on core boxes around wear inserts; sometimes makes fewer core boxes necessary; regularly lasts 10-20 times as long as metal inserts; quickly changed. Furnished with or without bolt.

DURASTRIP

Durastrip is a resilient, plastic sheet from which wear strips for core boxes or wear inserts of any shape can be cut readily. Its perfect fit forms a reliable air seal between box and blow plate, eliminating leakage and resultant wear; it is easily and quickly cemented into place; outwears metal 10-20 times.

DURAROD

Durarod is a resilient plastic rod, not tube, which seals the parting line of core boxes to prevent wear. It does away with blow-by *before it starts,* permitting the metal wear plate to function properly and wear indefinitely. No cement, no bother, no time lost, inasmuch as replacement is a matter of a few seconds.

EASTERN CLAY PRODUCTS, INC., JACKSON, OHIO

ECP

DIXIE BOND • BLACK HILLS BENTONITE • REVIVO BOND • REVIVO SUPER BOND • BALANCED REVIVO

All TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research

Here's one SURE way
to increase production and cut costs—

Use NORTON Wheels
on Your Portable Grinders!

• Right for Fast Cut—
They contain ALUNDUM, 57 ALUNDUM, the newer 32 ALUNDUM or CRYSTOLON abrasive—one of which is exactly right for extra fast cut on each of your portable grinding jobs.

• Right for Smooth Cut—
They're available with resinoid, vitrified or rubber bond—bonds which help to produce smooth, chatter-free cutting action and to insure long life on every high or low speed grinding job.

• Right for Size and Shape—
Illustrated below are a few of the many sizes and shapes available for handling different portable grinding jobs easily and efficiently.

Contact your Norton Abrasive engineer or distributor for details and specifications.

NORTON COMPANY • WORCESTER 6, MASS.

Distributors in All Principal Cities

Consult Your Classified Telephone Directory

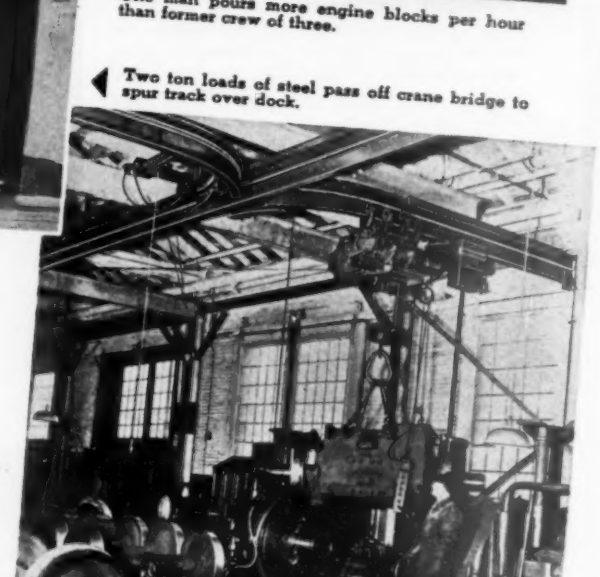
W-1244

NORTON ABRASIVES

HEAVY LOADS GO "Up and Over" with finger tip control

One man pours more engine blocks per hour than former crew of three.

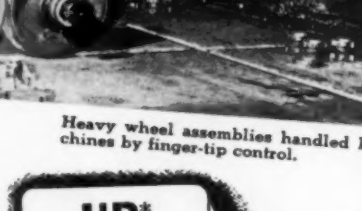
Two ton loads of steel pass off crane bridge to spur track over dock.



Heavy wheel assemblies handled between machines by finger-tip control.

American MonoTractors do the hard jobs the easy way. They perform automatic "Up and Over"* handling operations with extreme accuracy and reliability. Finger-tip control assures accurate movement and spotting of the load. "Up and Over" machinery and equipment means no damage to machines or materials and no congestion in the operating area. More important, they eliminate back-breaking labor. The hazard of bad strains and hernia is gone.

In short, American MonoRail Overhead Handling Equipment increases production, saves labor, saves time and cuts costs. American MonoRail engineers will gladly show you that automatic handling pays and saves.



Free **MOVIE**

A twenty-minute 16 mm. sound film gladly loaned upon request.

THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE **CLEVELAND 7, OHIO**

American Wheelabrator gets good results with SIMPLICITY SHAKEOUT UNIT

Typical Airless Wheelabrator Unit of which there are over 5,000 in use today in Industry for blast cleaning.

In under 20 minutes, an entire heat of 260 to 300 molds containing wheel blade castings are handled on this Simplicity Shakeout installed in the American Wheelabrator & Equipment Corporation foundry at Mishawaka, Indiana. These castings average 4 to 5 lbs., and the Wheelabrator foundry reports that *much higher production* has been maintained since the installation of the Simplicity equipment. Simplicity Shakeouts are available in all sizes ranging from the big heavy duty "Quads" to a 2′ x 3′ Model A to handle *every type of production requirement.* If you're having shakeout trouble in your foundry just call for a Simplicity sales engineer . . . he can give you the answer. Why not write today.

FOR CANADA:
Canadian Bridge
Engineering Co. Ltd.
Walkerville, Ontario

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND, MICHIGAN

NEW . . . AO R2000 RESPIRATOR

WITH 7 TYPES OF CARTRIDGES and FILTER!

"Twist of the Wrist" Interchanging of all Cartridges, Filters, Accessories

AO presents the R2000 Respirator with a new type of retainer shell that accommodates 7 types of quickly INTERCHANGEABLE cartridges — THREE FOR PROTECTION AGAINST DUSTS — FOUR FOR GASES AND VAPORS — plus a DISK TYPE, CHEMICALLY TREATED DUST FILTER — eight respirators in one. Thus, for the first time, an overall dust respirator of the chemically treated, replaceable filter type provides secure protection against both specific dusts and specific gas and vapor hazards merely by interchanging the cartridges. Four new all metal chemical cartridges of NON-SPARKING, seamless aluminum protect against fire hazards, weigh less than previous types and have increased fill for added adsorptive capacity. Deterioration caused by moisture and rough handling is retarded.

APPLICATIONS & ADAPTATIONS

R2000

Compact, five inch chemically treated "throw away" R25 filter has the efficiency of previous filters eight times its size. Protects against both poisonous and disease-producing dusts and against a *combination of all dusts* — toxic, nuisance and pneumoconiosis-producing. Gauze pre-filter adds to filter life by blocking entry of larger particles. Approved by Bureau of Mines, No. 2154.

R2031 — (R31 Cartridge)
For low concentrations of light organic fumes, vapors and gases generated in paint spraying, degreasing, dry cleaning, cementing, etc. Adsorbs benzene, xylene, toluene, gasoline, acetone, turpentine, etc.

R2032 — (R32 Cartridge)
For low concentrations of acid gases, fumes and mists such as sulphuric acid, hydrogen chloride, nitric acid. Protects against fumes from plating and pickling tanks, etc.

R2033 — (R33 Cartridge)
For low concentrations of combined acid and organic gases such as halogenated hydrocarbons and trichlorethylene; carbon tetrachloride, acetic acid. Protects against gases, fumes and vapors in degreasing operations, etc.

R2034 — (R34 Cartridge)
For nuisance concentrations of ammonia only.

R2015 — (R15 Cartridge)
For nuisance and pneumoconiosis-producing dusts in mining, quarrying, tunneling (quartz, sand, asbestos, coal, marble). *Not* to be used against vapors, gases or toxic dusts. Bureau of Mines Approval No. 2121.

R2016 — (R16 Cartridge)
For toxic dusts caused by grinding and crushing lead, cadmium, arsenic, chromium, manganese, selenium, vanadium. *Not* to be used against gases or vapors of above material. Bureau of Mines Approval No. 2138.

R2017 — (R17 Cartridge)
For a combination of all dusts, including toxic, pneumoconiosis-producing and nuisance dusts. *Not* to be used against gases or vapors. Bureau of Mines Approval No. 2138.

Order from your nearest AO Safety Products Representative and consult him about the protection to meet your needs.

American Optical
COMPANY
Safety Products Division

Southbridge, Massachusetts • Branches in Principal Cities

TO ALL outward appearances any two grades of shot or grit may appear to be as much alike as peas in a pod—but there the similarity ends. Rarely do they perform alike.

In using HI-GRADE Shot and Grit you'll find there IS a difference . . . a recognizable value far beyond purchase price that shows up in extra performance on the job.

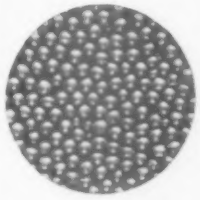
Though you may be satisfied with the material you are now using, it is just good business not to deny the promise of uniform, lower cost, more efficient blast-cleaning which HI-GRADE Shot and Grit can fulfill for you.

You can't be blamed for wanting longer use-life in the abrasives you use—more efficient cleaning and peening—a better finish in less time. Get these advantages with HI-GRADE Shot and Grit. Requisition a trial quantity today. You'll never regret it.

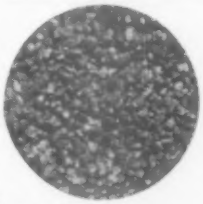
Packed in 100 lb. Bags—Ready for Immediate Shipment

METALLIC

SHOT HI-GRADE GRIT



HI-GRADE SHOT
UNIFORM SIZE AND HARDNESS
Withstands repeated strain, stress and wear. Exclusive alloying and tempering process helps prevent rust; minimizes impact fractures.



HI-GRADE GRIT
SHARP, TOUGH AND DURABLE
Made of same material and processed by same methods as Hi-Grade Shot. Cleans with maximum efficiency. Reduces equipment wear and maintenance costs.

HI-GRADE SHOT AND GRIT MORE THAN MEETS S.A.E. SPECIFICATIONS—SCREENED AND GRADED FOR 100% USAGE

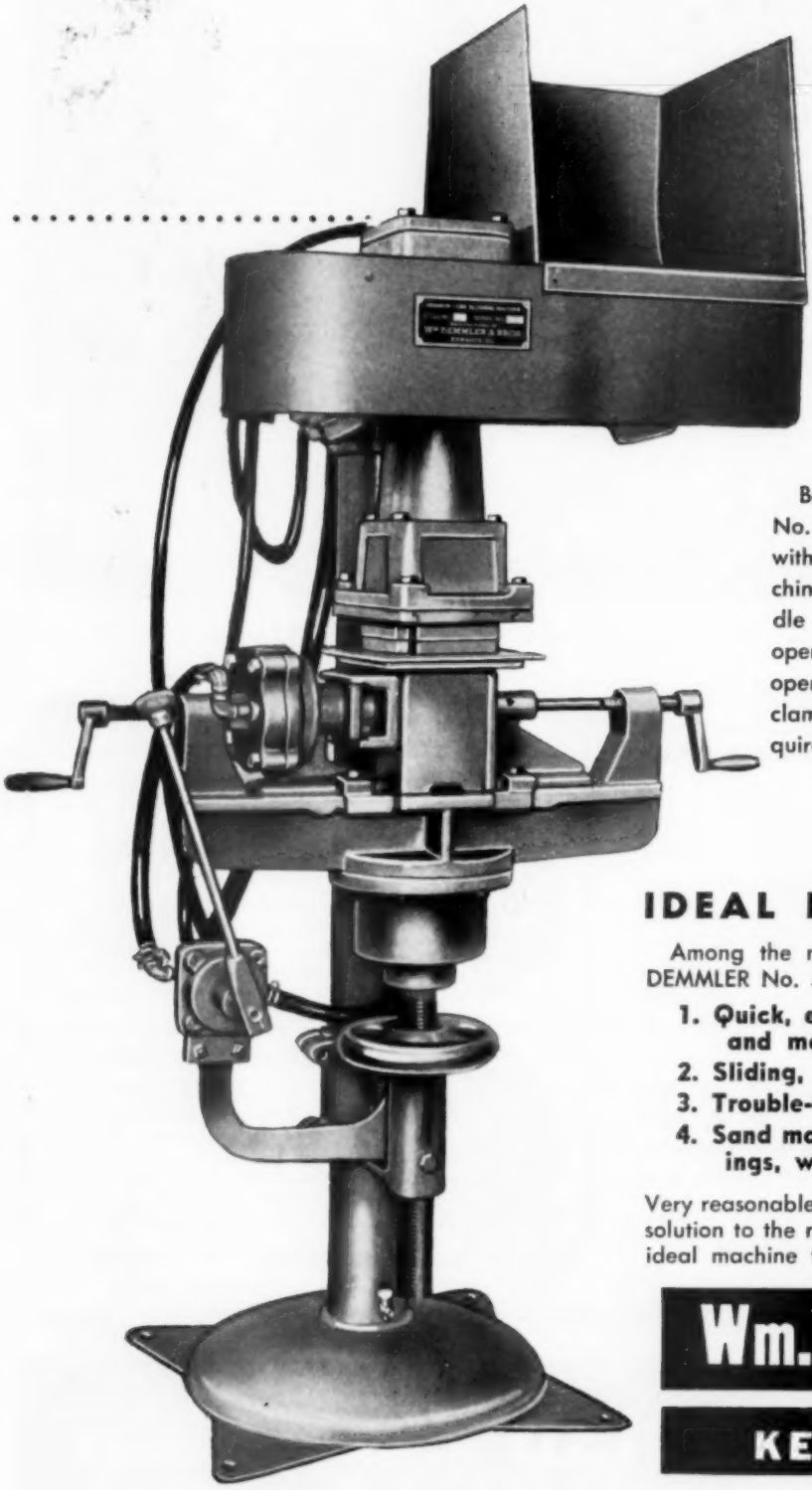
Clayton-Sherman Abrasives Company

MANUFACTURERS OF *QUALITY-CONTROLLED* SHOT AND GRIT

Representatives in Principal Cities

3896 LONYO ROAD ★ DETROIT 10, MICHIGAN

DEMMLER Core Blower NO. 55



A FAST CORE BLOWER EVERY FOUNDRY NEEDS AND CAN AFFORD

Because of its many features, the new Demmler No. 55 Core Blower was quick to gain popularity with foundrymen everywhere. This versatile machine will accommodate boxes 9 inches long—handle cores weighing up to 3 pounds. Sand magazine opening is 4½ by 9½ inches. A single hand valve operates both vertical and horizontal core box clamps and blows the core. Only 3 seconds required for complete cycle!

IDEAL FOR SHORT RUN JOBS

Among the many high quality features found on the new DEMMLER No. 55 are:

1. **Quick, easy adjustments for raising the table and moving chuck jaws.**
2. **Sliding, quick change blow plates**
3. **Trouble-free diaphragm type blow valve**
4. **Sand magazine and carriage of aluminum castings, with ball bearing rollers**

Very reasonable in price, the DEMMLER No. 55 is the economical solution to the rapid production of high quality small cores—an ideal machine for any foundry whether large or small.

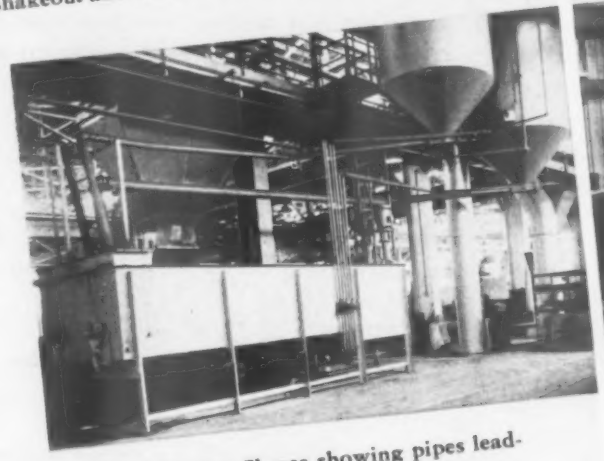
Wm. Demmler & Bros.

KEWANEE, ILLINOIS

SEND FOR ILLUSTRATED SPECIFICATION SHEET

Type "CH" Hydro-Clone showing direct hookup with shakeout and sand-handling system.

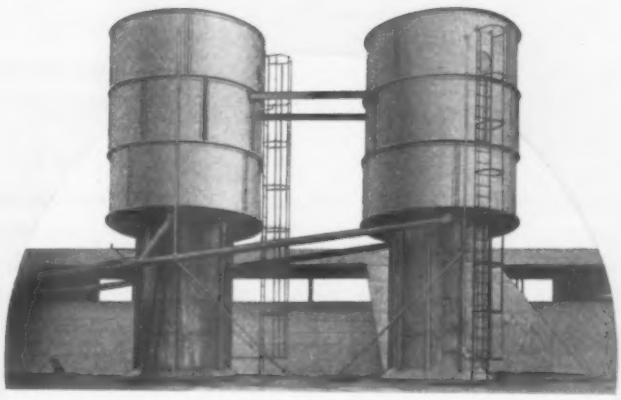
Type "H" Hydro-Clone mounted out-of-doors on a low roof. Bottom pipe leads to sludge disposal system.



Two Type "V" Hydro-Clones showing pipes leading to sludge dewatering tank (lower left).

Dust and gases at shakeout are drawn to side hood for disposal in Hydro-Clone suppressor.

how WHITING HYDRO-CLONES suppress foundry dusts at their source



Hydro-Clone Type "W" Dust and Spark Suppressor is used in conjunction with a Stack Gas Oxidizer and Flame Suppressor. This equipment complies with the new, rigid codes which have been put in effect in some cities.

There is a Hydro-Clone for every foundry need—suppressing dust with water and reducing it to harmless, easily disposable sludge. Discuss your dust problems with a Whiting sales engineer—ask him for a proposal which will meet your special needs.

WHITING CORPORATION

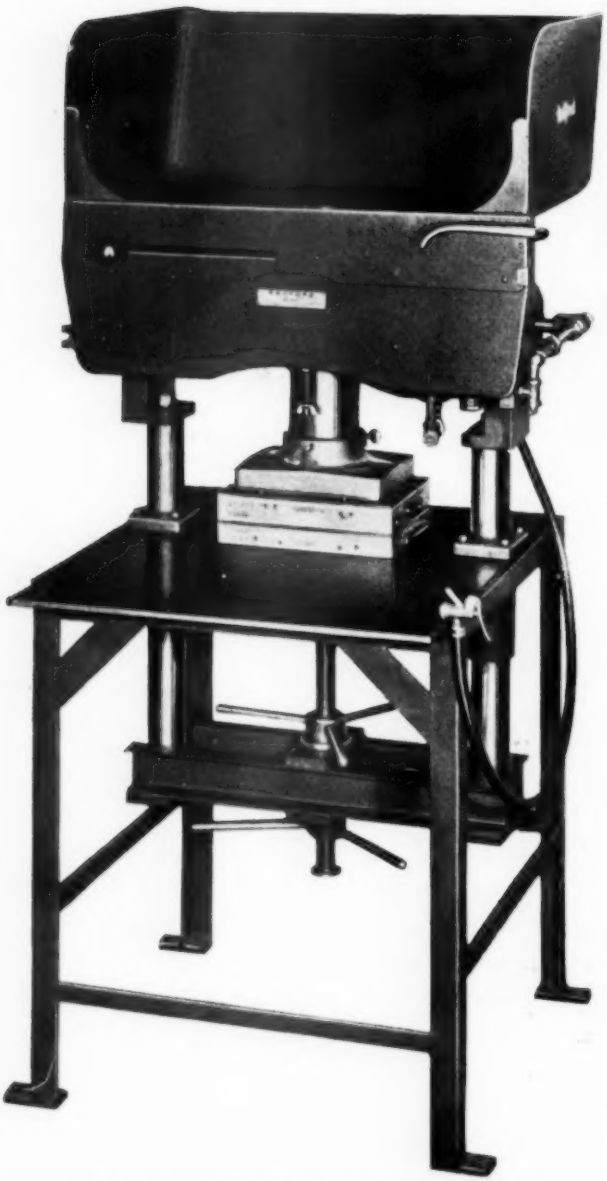
15607 Lathrop Ave. Harvey, Illinois

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.

The NEW

Redford NO. 2 CORE BLOWER

STATIONARY MAGAZINE TYPE



★ *Write for Specification BULLETIN "F"*

More production with the new and original REDFORD NO. 2. New standards are being set, not only because the machine itself is fast, but because every motion of your operator has been correctly evaluated to obtain a maximum of production with a minimum of effort.

8 OUTSTANDING FEATURES:

1. Large stationary work area of convenient height. All work can be done right on the machine table, eliminating unnecessary handling of core boxes.
2. Large sand supply hopper directly in front of the operator and readily accessible.
3. Stationary sand magazine that has a unique loading device eliminating the usual time and effort consuming operation of moving the magazine from filling to blowing position.
4. Easy accurate locating of core boxes against stationary magazine heads.
5. Quick change magazine heads or Redford Sand Cartridges.
6. Quick adjustment for different height core boxes.
7. Quick change, fully adjustable, automatic clamping attachment for vertically split core boxes.
8. * Actuating one handle puts the machine through the complete cycle of clamping the core box, blowing the core and releasing the core box, in two seconds.

*Any core blowing machine will blow a core in a few seconds. Related operations and human fatigue are the important factors in setting your rate of production. The New Redford has been developed to give both unequalled performance and unequalled ease of operation.

CAPACITY: Cores up to 5#.

Redford IRON & EQUIPMENT CO.

PHONE: KEnwood 1-8611

20733 GLENDALE AVENUE • DETROIT 23, MICHIGAN

rely on
metal-cast
ferro-alloys

U. S. PATENT
2,197,660

an exclusive development of Ohio Ferro-Alloys!

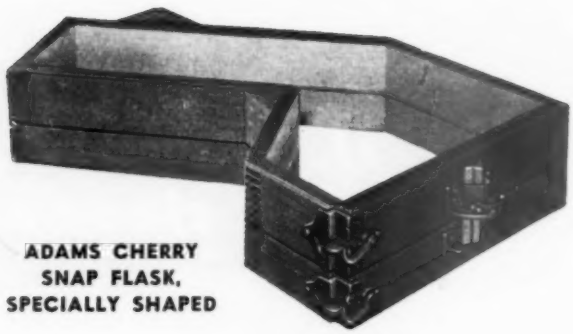
Ferro-silicon 25, 50, 65, 75, 85, 90%
Special blocking 50% Ferro-silicon
Low Carbon Ferro-chrome Silicon
High Carbon Ferro-chrome
Ferro-manganese
Borosil
Simanal

PHILO BRAND
© OFA 1935
RAINIER BRAND
© OFA 1941

Ohio Ferro-Alloys Corporation
Canton, Ohio
Chicago Detroit Pittsburgh San Francisco Tacoma

BRIQUETS
SILICON • MANGANESE • CHROME
SILICO-MANGANESE

ADAMS ALUMINUM
SLIP FLASK



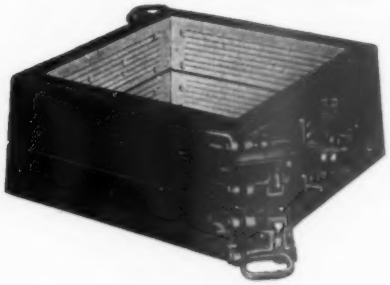
ADAMS CHERRY
SNAP FLASK,
SPECIALLY SHAPED

Any Shape—Any Size

FLASKS OR FLASK EQUIPMENT

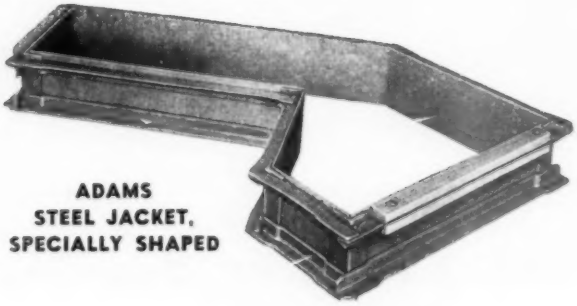
ADAMS-BUILT

To Your Exact Specifications

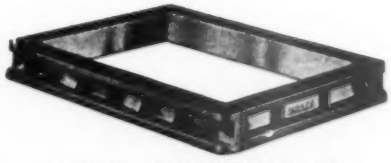


ADAMS CHERRY
EASY-OFF FLASK

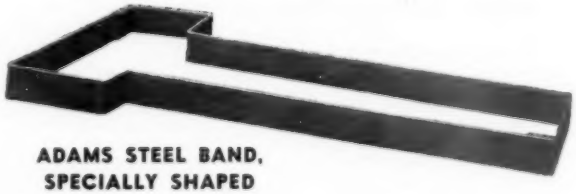
Whatever style, size or shape you need, Adams Custom made Flasks and Flask Equipment are built to your order, with any desired length, width or depth, by men who *know* foundry requirements. And when they are *Adams-Built,* they assure more efficient performance, longer life and faster production. They are designed to maintain peak production of high-quality castings, reduce rejects, lower production costs. It is hard to surpass Adams Flasks for accuracy, convenience and economy. Write for complete information today.



ADAMS
STEEL JACKET,
SPECIALLY SHAPED



ADAMS ALUMINUM UPSET



ADAMS STEEL BAND,
SPECIALLY SHAPED

THE ADAMS COMPANY
800 FOSTER ST. DUBUQUE, IOWA

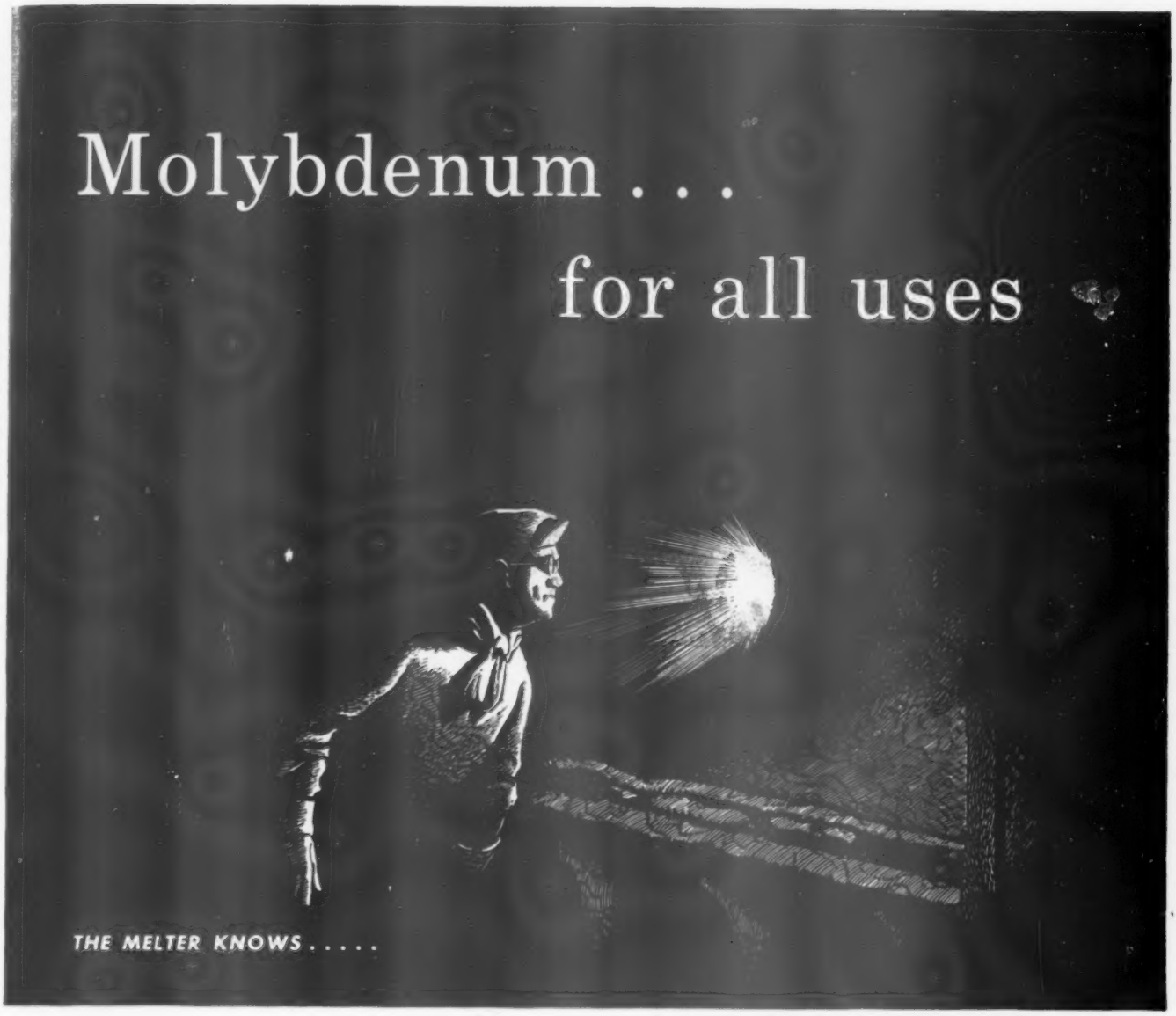
The ADAMS Company

ESTABLISHED 1883

DUBUQUE, IOWA, U.S.A.

MOLDING MACHINES and FLASK EQUIPMENT

Molybdenum . . .
for all uses



THE experienced melter knows he can depend on Molybdenum additions for uniform effects as calculated. He knows the customer can depend on the higher physical properties that Molybdenum adds. His comfortable assurance in the use of so trustworthy an agent is good to have. As a supplier of Molybdenum, Tungsten, and Boron, the Molybdenum Corporation is glad to be consulted at any time.

AMERICAN Production, American Distribution, American Control, Completely Integrated.

Offices: Pittsburgh, New York, Chicago, Cleveland, Detroit, Los Angeles, San Francisco, Seattle.

Sales Representatives: Edgar L. Fink, Detroit; Brumley-Donaldson Co., Los Angeles, San Francisco, Seattle.

Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.; General Tungsten Manufacturing Co., Inc., Union City, N. J.

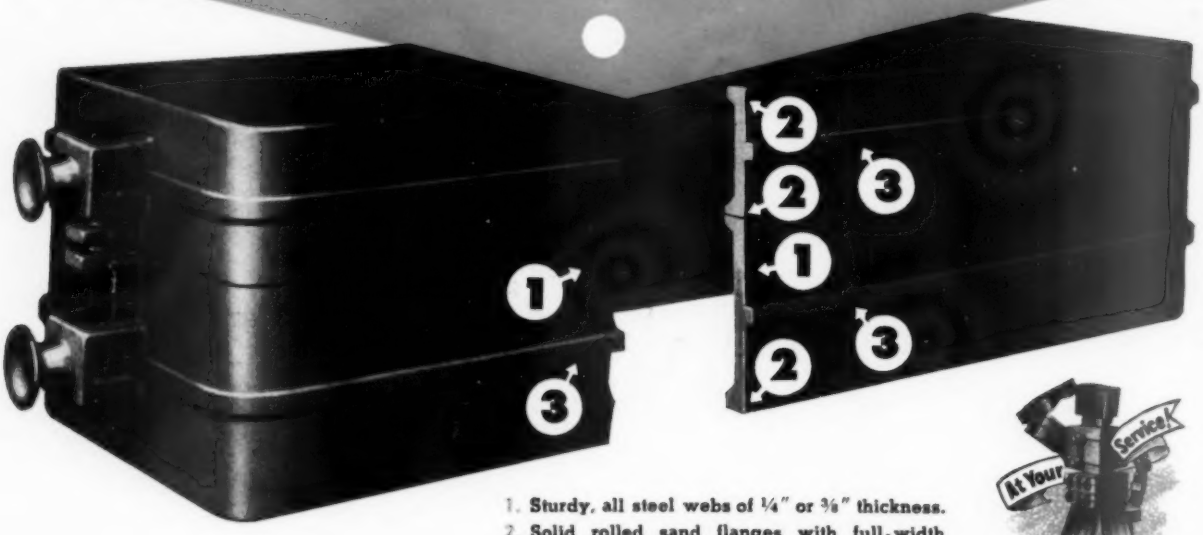
Works: Washington, Pa.; York, Pa.

Mines: Questa, New Mexico; Urad, Colorado.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

Where can you find a more RIGIDLY-BUILT FLASK



1. Sturdy, all steel webs of ¼" or ⅜" thickness.
2. Solid rolled sand flanges with full-width bearing.
3. Husky, solid center reinforcing bars.

Sterling Flasks Give You a Combination of MAXIMUM Strength and MINIMUM Weight

You can easily meet tough foundry pouring schedules with Sterling Flasks. They have strength where stress is greatest, as the cut-away view above reveals. Note the husky rolled channel steel construction . . . the solid reinforcing bars . . . the thick flanges with square corners and full-width bearing. These are patented, life-prolonging features that assure rigidity and accuracy, even under constant production pressure. Yes, Sterlings are engineered for durability and custom-built to meet your particular requirements. Send us your blueprints today for prices and delivery.

STERLING WHEELBARROW COMPANY
Milwaukee 14, Wis., U. S. A.

A 5705-1P-C

Are You Building Men For Supervisory Jobs?

SEVERAL years ago the president of a foundry told me about a problem of finding a capable foundry manager to take charge of his plant. The pattern of his story was familiar. The man in charge of the shop for a considerable number of years had grown too old to carry the burdens of production, especially at a time when demand for castings was heavy, and raw materials were in short supply.

The president of the company felt that perhaps some of the shop practices were not in keeping with the latest developments in casting technique. While good castings were being produced and the company was showing a profitable operation, management was not sufficiently familiar with the industry's technical progress to know if the organization was doing a better than average job.

With this doubt in mind, retirement of the old manager seemed the opportune time to bring in new blood in the way of skilled supervision. What could be simpler than to hire a man with the desired background, training and experience and turn the production problem over to him.

After the idea had been presented, the president was questioned on the availability of supervisory talent within his own organization. It was pointed out that surely a company of this size would have some employee who had shown sufficient promise over the years to be trained for just such an eventuality as now confronted the firm. Men from his own organization with initiative and ability would have the advantage of knowing the plant, the personnel and the customers.

However, the president was certain that there was no one on the staff capable of taking charge of the foundry. So he interviewed men, and eventually hired a capable foundryman. But the new manager was in a difficult position from the start. The employees did not want a stranger as manager. Management did not discard the feeling that the new man was on trial. A good job was done, but after a while the manager decided life was too short to play out the game and he retired.

Sometime later I ran across the president, and out of curiosity asked who was running the shop. With a smile and a bit of pride, he replied that one of his own boys was in charge. In the emergency one of the foremen had been sent in to pinch hit, and to the astonishment of the management, but probably not to the boys in the shop, he was doing a beautiful job.

Much has been said in recent years about training foundry workers and in securing trained engineers for the industry. Unless management looks for and discovers the talent in its own organization, and then helps these employees up the ladder to jobs of greater responsibility, good men will not stay with the organization.

Frank G. Steinebach
Editor

THE FOUNDRY—WHEREVER METALS ARE CAST

A FOUNDRYMAN

By A. W. GREGG
Consulting Engineer
Whiting Corp., Harvey, Ill.

THE AUTHOR, who presented the exchange paper from the American Foundrymen's Society before the recent International Foundry Congress in Amsterdam, gives some of his impressions of European foundries visited during his trip abroad

THE International Foundry Congress in Amsterdam and an invitation to prepare for the congress the exchange paper from the American Foundrymen's Society, provided the occasion for my recent trip to Europe. Subject assigned for the paper was "Ferrous Melting Furnaces in the United States and Canada[1]." Books could be written on the subject, and the problem was to decide what to omit.

Like most Americans, I speak only one language; consequently I wondered what kind of an audience I would have. As it developed, about 80 per cent of my listeners understood English—or perhaps I should say American, because I found in Europe (and especially in England) that what I speak is not English but American, which is something different.

The conference lasted a full week from Aug. 29 through Sept. 2, and was attended by about 300 people from all over the world. Countries represented were Belgium, Czechoslovakia, Denmark, England, France, India, Italy, Luxembourg, Norway, Poland, Scotland, Sweden, Switzerland, United States and of course the open, friendly and hospitable Netherlands.

I met some fine people in Holland and visited some good foundries. Foundrymen are the same kind of people wherever you find them. As one of my good old bosses always claimed, "foundrymen are the cream of the country—any country."

One of the plants visited was the Nederlandsche Staalfabricken Demka at Utrecht, and the accompanying illustration shows the group from the conference which visited this plant. On the same day this group visited Werkspoor N. V., also at Utrecht. This plant makes railroad cars (which the Dutch call Wagon-Litts) and has a good foundry casting about 40 tons a day. The manager, J. S. Abscower, is a capable foundryman and deeply interested in his apprentices. These boys are a fine looking lot of youngsters (12 to 14 years old) who have their own department and, under the supervision of an old-time molder, were turning out a lot of good-looking small castings. Apprentices serve 6 years and there were half as many apprentices as molders.

Right—Royal Institute of the Indies, Amsterdam, Holland, site of the International Foundry Congress

Far Right—Group from International Foundry Conference visiting Nederlandsche Staalfabricken plant at Utrecht. The woman in the group operates a small foundry casting about 2 tons a month. In the back row, extreme left, Vincent Faulkner, editor, *Foundry Trade Journal*, stands next to the author

ABROAD

Great emphasis is placed on appearance and finish in all European foundries and I'll have more to say about that later.

Before getting away from Holland, I must say something about the Hollanders in general. Everyone at the conference remarked about the cordial and friendly attitude of the Dutch people. Most of them speak and understand English, and if you are a visitor in Holland you have the key to the country. Their cities are beautiful and so clean that it's almost painful. Incidentally, I saw only one man wearing wooden shoes all the time I was in Holland. Apparently three-fourths of the people ride bicycles.

From Amsterdam I went to Brussels and spent a week driving all over Belgium and Luxembourg with the manager of the Societe Belge-Fermont Co. I visited 13 foundries and steel plants with this gentleman, who kept me on the go every day from early to late. Belgium struck me as a very prosperous and busy country. Some of the plants visited were really remarkable.

I was especially impressed by the John Cockerill Co. plant at Seraing-les-Liege. This company has open-hearth, electric-furnace and converter steel foundries and a very large gray iron foundry. Among other things, it makes large ship castings, and I saw some of the most intricate and skillful loam molding practice I have witnessed anywhere. This is almost a lost art in America. A molder doesn't have a pattern—he is handed a blueprint, and it's up to him to make the job, which is usually a very large and heavy casting of which there is only one on order.

Fifteen or twenty molders were doing this class of work, and I asked Mr. Goffart, the foundry manager, where he obtained such mechanics. He said they were home-trained men, and when I asked about the period of apprenticeship, I was amazed to learn that boys start at about 12 years of age and serve 20 years before being rated as full-fledged mechanics. Our American boys think 4 years is entirely too long for apprenticeship.

Other very good plants in Belgium are those of Gustave-Boel at LaLouviere, and Fonderie Nestor Martin at Brussels. We were conducted through the Gustave-Boel plant by Pol Boel, a grandson of the founder of the business. He spent several years in the United States and is a graduate of the Sheffield Scientific School at New Haven, Conn.

Everywhere I called I received the most cordial and friendly welcome. It is unfair to mention one or two plants, but space does not permit mention of all of the good foundries visited.

We drove through Bastogne, where the American Army stopped the Germans at the Battle of the Bulge. General McAuliffe was badly outnumbered at this point and in real trouble before Patton came up to reinforce him. When the Germans demanded his surrender, McAuliffe's reply of "Nuts" tickled the Belgians. Bastogne is now known as the "Nuts City," and the big square in the center of town is named "McAuliffe Square." I was told that every year on the anniversary of the battle, American flyers scatter nuts all over the town for the children.

I spent one day in Luxembourg, which is a beautiful little country, and visited three good foundries there.

The next week was spent in France with headquarters in Paris. One of the most modern and best mechanized plants in Europe is that of the Renault Automobile Co. at Paris. This company builds the most popular automobile in France. It is a small car and very economical to operate. Incidentally, Fords and Chevrolets look like (*Please turn to page* 214)

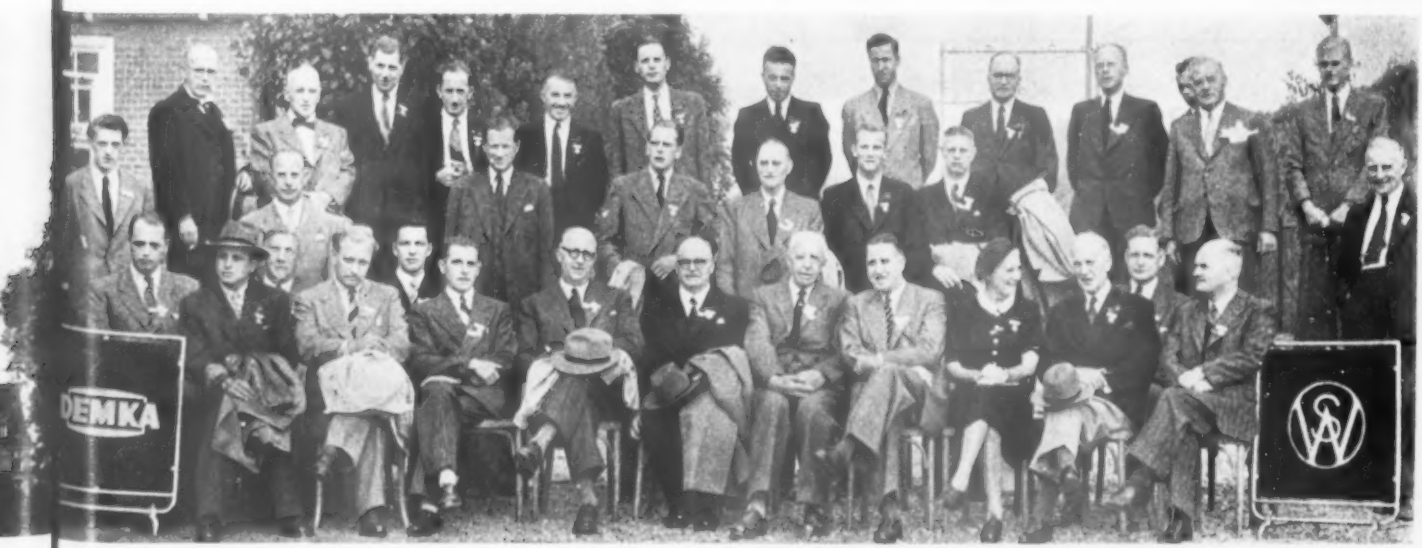


Fig. 1—Cleanliness in the foundry is important in producing high-quality castings

Melting Practice FOR COPPER-BASE A

IT SHOULD be apparent to everyone in the foundry business that there is no *one correct way* to make any casting. There must be at least several methods by which a casting can be made sound, defect free, and salable.

How often it is possible to trace a pattern through a number of foundries, each of which produces an acceptable casting *after* making what are considered necessary changes in gating and risering! If all the castings of the same pattern made in different shops were placed side by side, the wide variety of manufacturing techniques would be immediately obvious, even though the end product is of the same quality.

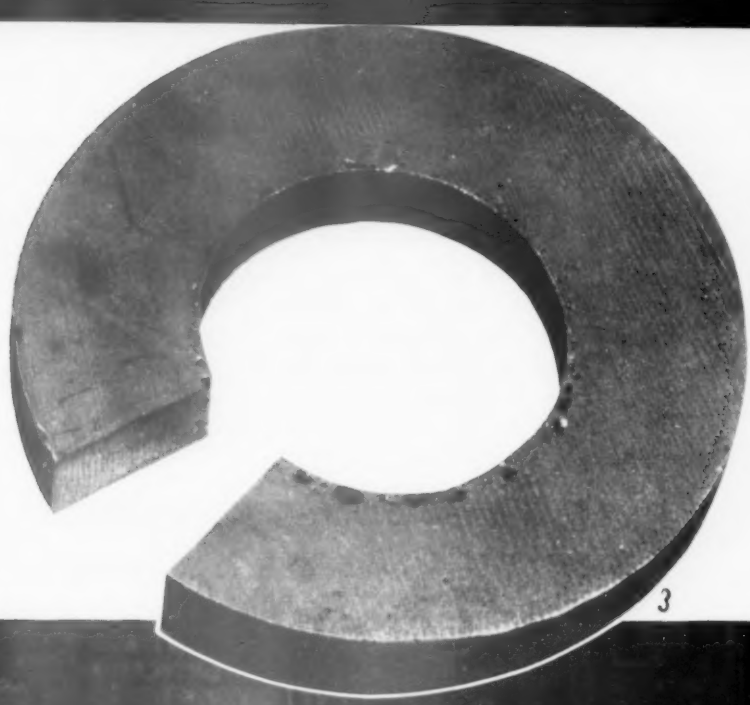
This absence of standard foundry methods creates most of the problems in gating and risering; for many jobs considerable experimenting is necessary before an acceptable casting is produced. While the methods of various foundrymen may differ greatly, general acceptance of the various end-products seems to indicate that quality is nearly the same in each. It is quite possible, of course, that better inspection methods—radiography, Zyglo, etc.—would find considerable variance between castings; even so, there are still many ways to make any particular casting sound.

If it is true that a variety of gating and risering techniques will produce sound castings, it is also true that there is more than one melting practice for copper-base alloys that will produce good quality metal. With a thorough understanding of the melting process, it is possible to design a number of furnace practices that will give satisfactory results.

Each foundryman has, of course, worked out some melting practice that he considers adequate. While all of these techniques may not be based on complete understanding of the chemistry and physics involved, they usually do provide a balance of conditions that results in metal (*Please turn to page* 111)

Ten Rules For Melting Copper-Base Casting Alloys

1. Use only clean, dry, uncontaminated melting stock in clean crucibles.
2. Melt with an oxidizing flame.
3. Melt rapidly.
4. Do not overheat the metal excessively.
5. Do not hold the metal at high temperatures.
6. Skim carefully.
7. Avoid using "coolers." Allow metal to cool to pouring temperature in the open air.
8. Use a reliable, calibrated pyrometer.
9. Use deoxidizers only in recommended amounts.
10. Avoid vigorous stirring just before pouring.



By R. A. COLTON
Research Metallurgist
Federated Metals Division
American Smelting & Refining Co.
New York

E ALLOYS

Fig. 2—Proper pouring is essential for sound castings. Holding the crucible lip as close as possible to the sprue reduces metal turbulence

Fig. 3—Gas porosity in high-leaded bronze. Such gas holes may result from inadequately vented cores, improperly melted metal or incorrect gating

Fig. 4 — While flame color may indicate type of melting atmosphere, safer practice is to measure amount of oxygen in the flame with Orsat apparatus and adjust burner accordingly

THIS review of recent developments in production of ductile iron was presented by the author as part of a symposium on nodular graphitic gray irons conducted during the annual meeting of the Gray Iron Founders' Society in Chicago, Oct. 27-28. For more technical details concerning the manufacture of this new cast product the reader is referred to the succeeding article—"Problems in Producing Ductile Iron," by Max Kuniansky, Lynchburg Foundry Co.—which is reproduced from that company's publication, *The Iron Worker.*

Factors affecting DEVELOPMENT of DUCTILE IRON

By DONALD J. REESE
International Nickel Co. Inc.
New York

Fig. 1—Electric motor fan made of ductile iron

Fig. 2—Machining a ductile iron cylinder for use with forging hammer

Fig. 3—Top and side views of a ductile iron spring release hitch used with tractor and plow

DUCTILE iron was developed after many years of experiment and testing in the Bayonne (N. J.) Research Laboratories of the International Nickel Co.'s Development and Research Division. When adequate amounts of magnesium are successfully introduced into iron-carbon-silicon alloys, two very remarkable things happen. First, graphite precipitates out in an optimum form and then, when this objective is successfully attained, a whole new field of ferrous materials is made possible.

A close parallel exists between this new drama in the field of ferrous materials and that of the legitimate theater. When one goes to the theater, the stage lights go on, the audience lights dim and the curtain goes up—that's the part of the show that parallels the drama of adding magnesium to the iron-carbon-silicon alloys. It's the curtain raiser. The drama unfolded after the curtain goes up is what one paid to see, and the drama of what goes on after magnesium is successfully introduced into the iron-carbon silicon alloys is what one should strive to understand.

If the stage hands were unable to raise the curtain, one might never see the show. Metallurgical stage hands have struggled with this curtain in the field of the iron-carbon-silicon alloys for a long, long time, and now that it has been successfully raised, one should not over-concentrate on the mechanics of raising the curtain and fail to see the show.

Those who think the job of producing ductile iron component parts—parts that will pass rigid testing and inspection requirements, parts that measure up to varying processing and service application requirements—is as simple as obtaining a few pounds of some magnesium alloy, adding it to molten iron and then pouring this iron into a mold, are due for disappointment. However, those who believe this is one of the greatest developments of all times in the field of ferrous metals and have a firm determination to become completely informed on the development and employ the development with intelligence and respect, may anticipate one of the greatest thrills of their industrial experience. Just think of it, a cupola (or other furnace) product having 3 to 20 per cent or more elongation as cast, depending on the type of ductile iron; or an as-cast tensile strength of 70,000 to 120,000 psi, depending on the type of ductile iron; a modulus of elasticity of about 25,000,000; good yield strengths and good shock resistance. The sum total of engineering and physical properties available in this new material has never been available to industry heretofore.

What is an optimum form of graphite in the iron-carbon-silicon alloys? The highest engineering properties are achieved when the optimum form of graphite is a sphere.

What happens in the field of the iron-carbon-silicon alloys when vitamin quantities of magnesium are successfully introduced and an optimum form of carbon is achieved? First of all we produce ferrous materials that are essentially free of sulphur. It is not unusual to obtain sulphurs as low or lower than 0.005 per cent. When sulphur is present in appreciable quantities, say more or less than 0.1 per cent, manganese is used mainly as a scavenger to form the less harmful manganese sulfides rather than have iron sulfides present. Manganese in ductile iron is not needed as a scavenger agent because the material is essentially free of sulphur and when present in ductile irons functions as a potent alloy.

For certain members of the ductile iron family of materials (there are six basic types of ductile iron) it is desirable to avoid the alloy influence of manganese. For instance, if the objective is to produce a ferritic type of ductile iron having the greatest values in shock resistance, as-cast elongation and reduction of area, the amount of manganese might well be about 0.25 per cent. The lower limits are determined more by the amount of manganese present in the raw materials available, rather than by the met-

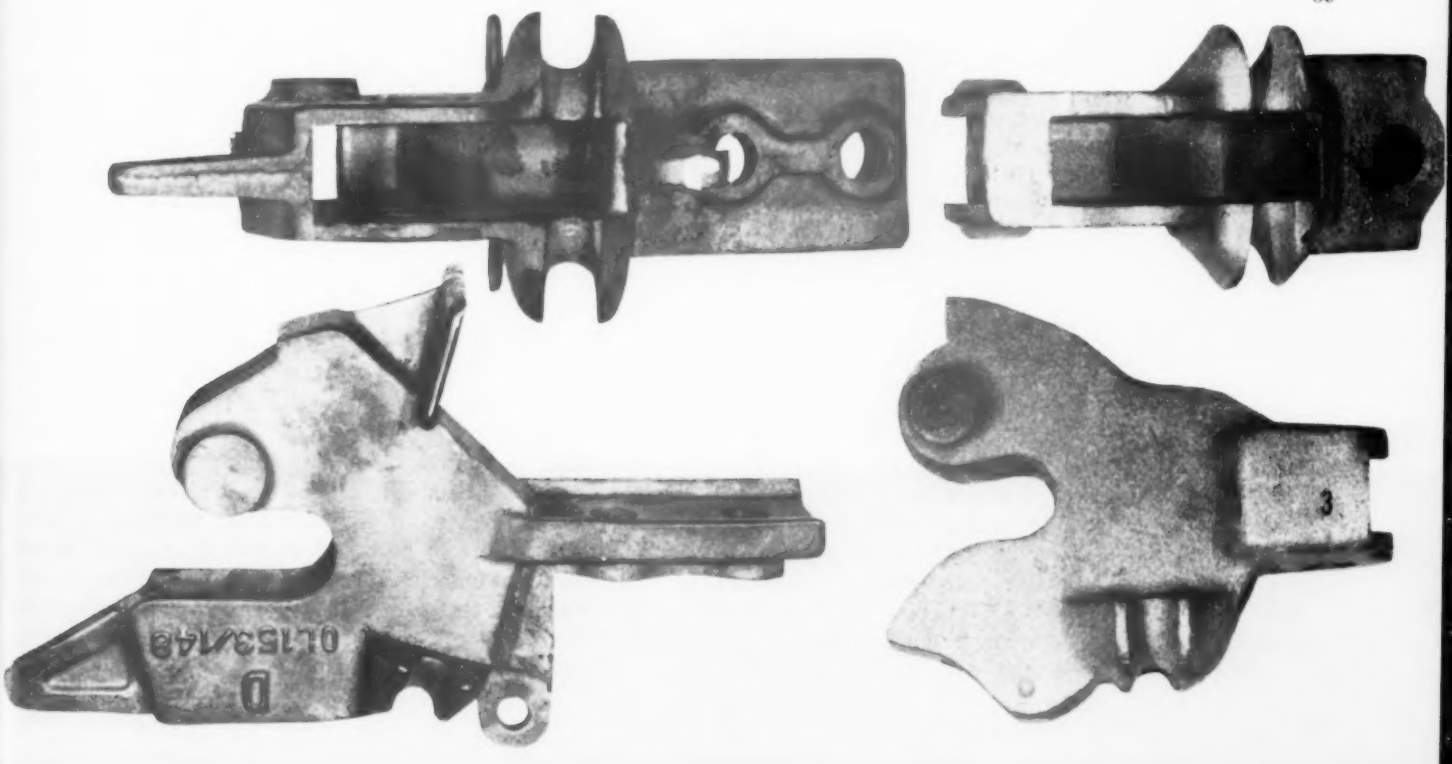


Fig. 5—Slag pot cast of ductile iron shown before gates and risers removed

Fig. 6—Heavy machine frame casting just removed from mold

Fig. 4 — This corner bracket for a hay rake frame made of ductile iron is both strong and economical to produce

Fig. 7 — Typical small parts made of ductile iron

Fig. 8 — Compressor head weighing 2200 lb. Tensile strength 60,400 psi, elongation 5 per cent. Head was burst hydrostatically at 3950 psi

allurgy involved in ductile iron production.

Manganese stabilizes pearlite and when the metallurgical objective is to produce a pearlite type of ductile iron, the alloy influence of manganese is desired. A pearlitic type of ductile iron is stronger, has less shock resistance, less as-cast elongation and less reduction of area than a ferritic type of ductile iron. Both types have proper fields of application and, conversely, either type may be improperly applied.

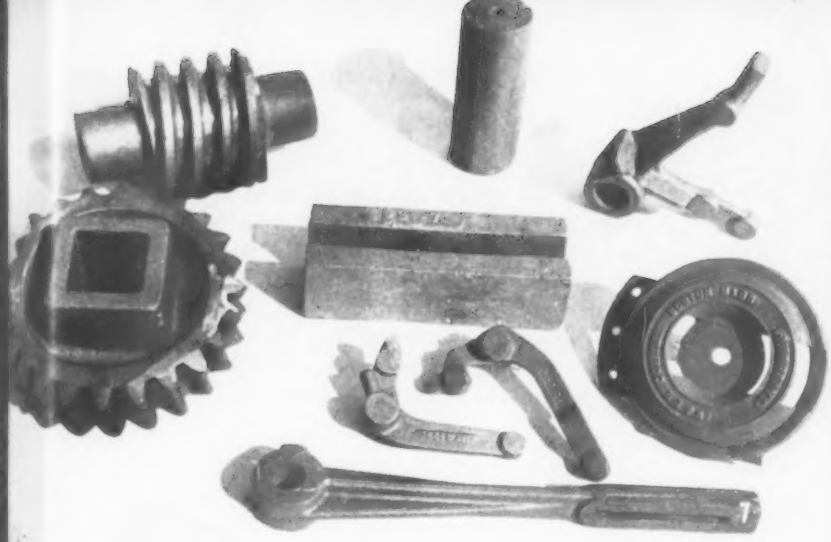
Ductile irons may be heat treated to enlarge the scope of as-cast properties by most of the heat treating methods now used in the ferrous metals industries. In most cases a type of ductile iron having the desired properties as cast can be made. In general, ductile irons will not require heat treatment.

Suppose the iron now being made in a licensee's foundry has 0.75 per cent manganese and 0.12 per cent sulphur and that it was to be treated with some alloy of magnesium to produce ductile iron. A pearlitic type of ductile iron would result because of the 0.75 per cent manganese. Should the objective be to produce a component part having of 15 to 20 per cent as-cast elongation, lower manganese would be necessary.

Now what about silicon? Whether we talk about malleable iron with its average silicon content of 1 per cent or about cast iron with its silicon content varying from 0.5 to 3.0 per cent, silicon has been used heretofore in the iron industries mainly for processing or founding purposes. In the ductile irons, silicon is used mainly as a potent alloy. Chemically pure iron or ferrite has a modest strength of about 40,000 pounds psi and has very, very high values in shock resistance, elongation and reduction of area. When chemically pure iron dissolves silicon, a product the metallurgist calls silica-ferrite, increasing amounts of silicon appreciably alter the properties of ferrite to make it increasingly stronger and harder and less ductile.

Yes, we are talking about one type of ductile iron, a ferritic type, and saying there are varying engineering and physical properties depending on whether the silicon content is 1, 1.5, 2.0, 2.5, 3.0, 3.5, or 4.0 per cent. A tremendous difference in properties results from the alloying influence of silicon. Should our licensees ever furnish a component part of ductile iron for an application, or should they ever talk to a design engineer about 40,000, 50,000, 60,000 or 70,000 psi yield strength, or to an electrical engineer about the electrical characteristics of ductile iron, they must make certain they are fully informed on the alloy influence of silicon.

Now what about phosphorus in ductile irons?



When vitamin quantities of magnesium are successfully added to the iron-carbon-silicon alloys, a spheroidal form of graphite is produced, irrespective of whether the amount of phosphorus is as little as 0.05 per cent or as much as 1.0 per cent. But that doesn't mean the engineering properties of an iron containing 0.4 per cent phosphorus are similar to those of an iron containing 0.04 per cent phosphorus. Phosphorus forms a brittle iron-phosphide constituent in all ferrous materials and optimum engineering properties are obtained in low-phosphorus ductile irons.

And what about carbon? The optimum form of graphite, a sphere, in ductile iron permits wide latitude in the amount of carbon present with relatively minor influence on the engineering or physical properties of the product. This is a very fortunate circumstance, for if silicon is to be utilized as an alloy, then we have to lean hard on carbon for founding requirements of castabiltiy, feeding, shrinkage characteristics, etc. The carbon content of ductile irons is generally 3.5 per cent or more. This latitude in carbon is not only a very useful founding tool, but it makes possible the founding of component parts requiring high engineering properties that heretofore have not been practical for manufacture in any of the foundry industries.

Up to this point I have talked about the elements in the chemistry of iron that we have always talked about—sulphur, manganese, silicon, phosphorus and carbon—and I have tried to point out to you how different these long-known elements function in ductile iron than they do in the products cast heretofore. Consequently, the first approach to a solid understanding of the ductile iron development should be one of really getting acquainted with sulphur, manganese, silicon, phosphorus and carbon.

If one really does a job in thinking about the influence of sulphur and phosphorus in ferrous metallurgy he will ultimately wonder about the general melting practice in the iron foundry industry which is an acid melting practice versus the overall practice in the ferrous metals industry which may be either acid or basic. There will be a trend toward basic melting in the production of ductile iron.

In the literature over the past 18 months the magnesium alloys mentioned included various combinations of nickel and magnesium, copper and magnesium, iron-silicon-magnesium, copper-iron-silicon magnesium, iron-silicon-manganese-magnesium, magnesium-cerium-zirconium, and others. We have previously discussed the alloying influence of manganese and silicon and now we must face up to other elements like nickel, copper, molybdenum, chromium, etc. Actually we are asking ourselves, "What are the economic and what are the metallurgical objectives?" A variety of magnesium alloys ranging in cost from 15 cents to more than $1 per pound have been announced. These are not our alloys. If one magnesium alloy performs pound for pound as well as some other magnesium alloy and also satisfies the metallurgical objective, it is obviously the one to use.

Obviously it could be economically unsound to use a high-priced alloy in certain potential ductile iron fields and metallurgically unsound to use an improper magnesium alloy in some other potential field.

To arrive at a sound answer as to what it costs to produce ductile iron, we must do a bit of thinking. Will 1 per cent or 100 per cent of the tonnage be ductile iron? It will cost more to make 1 per cent of the tonnage in ductile iron than an equivalent amount on a 100 per cent production basis. What about the cost of hot metal? Full utilization of magnesium treatment cannot be realized without analyzing hot metal costs and reviewing the use of raw materials with the intention of lowering hot metal costs. Next we should determine whether a 15-cent alloy, a dollar alloy or some alloy intermediate in cost best satisfies the economic and metallurgical objectives. Next we have to determine how much of these alloys to use per ton of hot metal. These are the major cost items likely to be emphasized but they are not the cost items I would emphasize. Can you compare the costs of producing an alarm clock with that of a watch? The cost of producing ductile iron is definitely in line with the selling price of a quality product.

Another element of cost that may be quite modest or can be prohibitive is the cost of your education. Millions of dollars are being spent in industry on this development. Much of this expenditure

could be charged up to education cost, and the unfortunate part of this expenditure is that much of it is for knowledge already known and little of it is directed to unexplored fields. If one wants to step out high, wide and handsome in this new field without regard to the knowledge already acquired, he could spend much more than his company can afford.

Our license arrangement involves a royalty and another element cost. This is a small fraction of a cent per pound. For one of the companies with which we are working, this royalty amounts to 2½ per cent of the savings effected on one particular component part.

Some have felt that the patent situation on magnesium-treated cast iron was confused. We applied for patents in all important countries of the world as it is expected that the inventions will be adopted on a world-wide scale, and our U. S. Patents have been issued—Patent Nos. 2,485,760 and 2,485,761.

We in the Nickel company feel that our research and development work in the cast iron field has been of real importance to the gray iron industry. I refer to the hundreds of (*Please turn to page* 216)

Problems in PRODUCING DUCTILE IRON

By MAX KUNIANSKY
Vice President and General Manager
Lynchburg Foundry Co.
Lynchburg, Va.

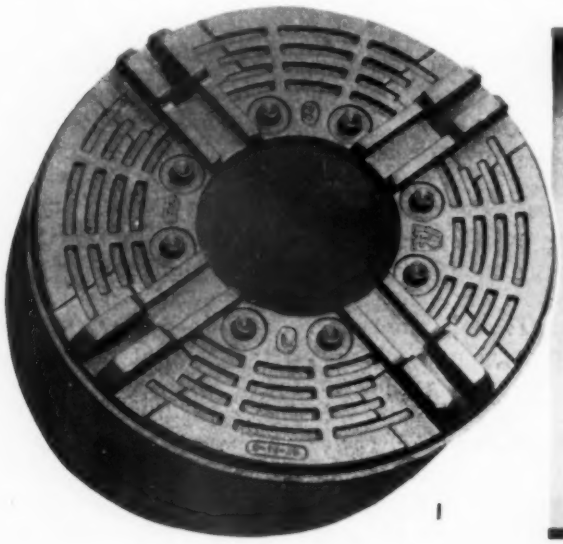
THE Lynchburg Foundry Co. is a licensee of the process for making ductile cast iron as developed by the International Nickel Co. Essentially the process involves treating a base iron with a magnesium alloy and then inoculating with 0.75 per cent ferrosilicon or zirconium silicide. The base iron preferably should be of the following composition:

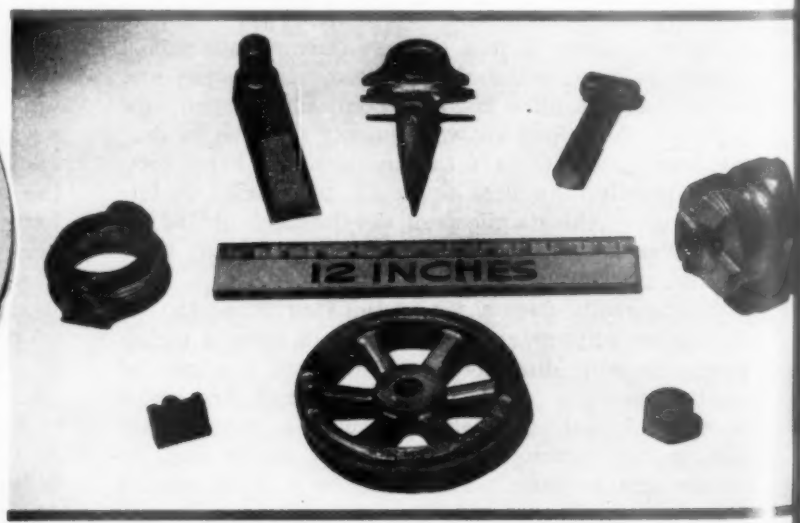
Silicon 1.60 to 2.00 per cent; sulphur 0.03 to 0.05 per cent (as low as possible); manganese under 0.40 per cent (as low as possible); phosphorus under 0.20 per cent (as low as possible); total carbon 3.40 to 4.20 per cent.

The development in itself is the most revolutionary in many years of cast iron metallurgy and, when successfully applied to production, fulfills dreams of cast iron foundrymen and metallurgists long unrealized.

Since becoming licensees early in 1949, we have made approximately 100 tons of 8-in. cast iron pipe 18 ft long by the Super-deLavaud method at our Radford plant. We tried three different mixtures: 1—Phosphorus about 0.65 per cent, total carbon 3.50 per cent. 2—Phosphorus about 0.65 per cent, total carbon 3.75 per cent. 3—Phosphorus 0.20 per cent and under, total carbon 3.90 per cent.

In each case we treated the iron with No. 1, No. 2 and No. 3 alloy and inoculated with 0.75 per cent fer-





rosilicon. No. 1 alloy is a nickel-magnesium composition. No. 2 alloy is a nickel-silicon-magnesium composition. No. 3 alloy is an alloy of magnesium without nickel. All these iron mixtures were run with high percentages of pig iron in the mixture and were desulphurized. The best mixture sulphurs were under 0.04 per cent. The manganese was kept low, therefore we obtained ductile iron by adding a lesser percentage of magnesium alloy. We obtained very high recoveries of magnesium after allowing for that used by the sulphur.

Specimens of pipe made with high phosphorus were ductile as to microstructure but had poor physical properties and poor ductility. It can be said definitely that the maximum phosphorus is about 0.20 per cent. A good Super-deLavaud 8-in. pipe as now made will have a bursting tensile of 22,000 psi and a modulus of rupture, as determined from the ring crushing test, of 55,000 psi. Elongation of a tensile bar machined from a Talbot strip will be negligible. Wall tensile on an 8-in. Super-deLavaud pipe will be about 33,000 psi.

A good low-phosphorus ductile iron pipe annealed at the same cycle as the regular pipe just described will give the following properties: Wall tensile 75,000 psi; bursting tensile 52,000-62,000 psi; modulus of rupture from ring 125,000 psi; elongation 5 per cent plus; impact 30 blows of 50-lb hammer from 5 ft without failure. In the impact test we drop a 50-lb hammer from 12 in. and raise height of hammer by 2-in. increments until a height of 5 ft is reached.

The ductile pipe of low phosphorus on bursting tests will bulge and open up. A high-phosphorus ductile pipe has high bursting tensile properties but no ductility and poor impact properties. On bursting, the high-phosphorus ductile pipe will fly to pieces. Lengths of pipe made from low-phosphorus iron show remarkable toughness and ductility, as can be seen from some of the twisted specimens. There can be little doubt that new fields will immediately open for a product possessing such properties. With the corrosion resistance of cast iron and the physical properties demonstrated, it is evident that it is truly a remarkable material. The economics unquestionably can be brought in line. There seem to be no operating difficulties in sight for this item of production.

The problem of applying ductile iron to engineering castings such as we make at the Lynchburg plant, however, presents complications. At Lynchburg we have been working with base irons of about the following compositon: Silicon 2.00 per cent; sulphur 0.04 per cent; manganese 0.30 per cent; phosphorus 0.10 per cent; total carbon 3.60 to 4.20 per cent.

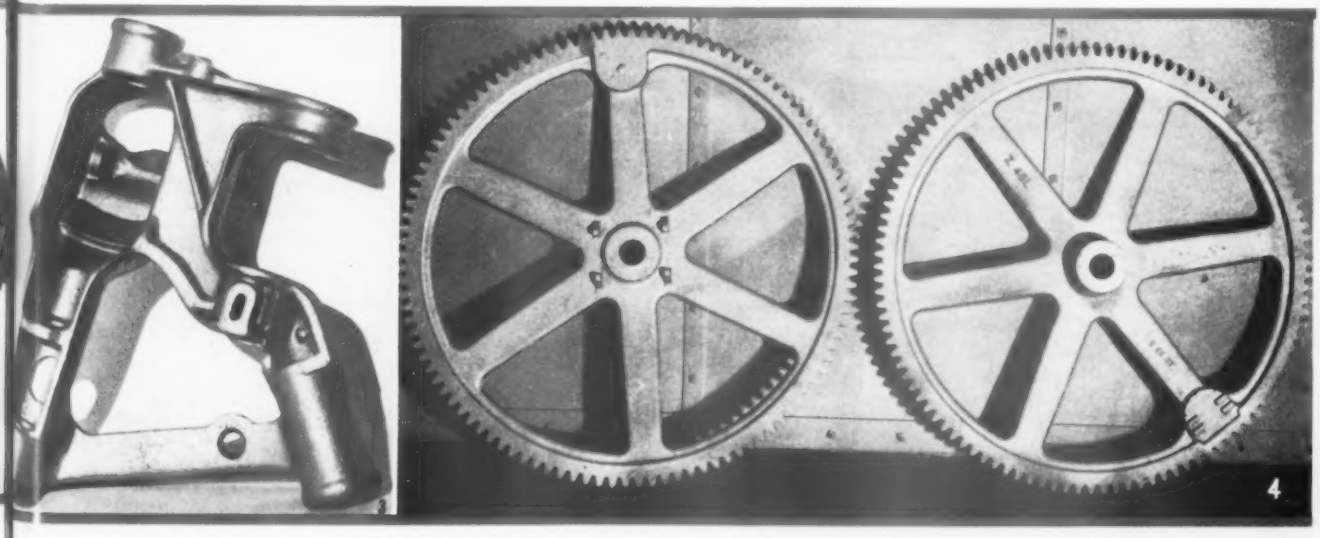
Tensile property of the base iron is about 15,000 psi. By treating with 1.50 per cent magnesium-nickel alloy and inoculating with 0.75 per cent ferrosilicon, the tensile property immediately exceeds 100,000 psi on 1-in. keel blocks. Elongation on the test bars machined from keel blocks not heat treated runs from 8 to 13 per cent. It is apparent, therefore, that when the physical properties are changed so drastically the castability properties are altered materially. In making the various castings shown here, each presented a foundry problem and much work had to be done in the matter of gating, risering and pouring speeds. In all our work we have concerned ourselves with properties in the castings rather than in the keel block. It is this effort at correlation that has made the job both slow and costly.

Our major difficulties have centered around the problem of pinholing, and flotation of the carbon nodules. When we were working with total carbons

Fig. 1—Clutch plate cast in ductile iron. Chemical analysis: Si 2.69, S 0.008, Mn 0.24, P 0.076, TC 3.78, Ni 0.77, Mg 0.100. Mechanical properties of casting: Tensile 77,400 psi, elongation 12.0 per cent, reduction in area 10.4 per cent, bhn 179. Mechanical properties of 1-in. keel block: Tensile 82,900 psi, elongation 15.0 per cent, reduction in area 11.9 per cent, bhn 196

Fig. 2—A group of small castings produced successfully in ductile cast iron

Figs. 3-4—Ductile iron castings produced for agricultural implement use



of 4.00 to 4.20 per cent, the problem of carbon flotation was much more bothersome than with total carbons of 3.50 to 3.60 per cent. We have been trying all along to make castings that would possess, in the as-cast condition (without heat treatment), the following properties: Tensile 80,000 psi plus; elongation 4 per cent plus, brinell hardness 241 or less.

These properties were obtained on bars from the castings. Our purpose in this line of attack is to make a casting that will have reasonable ductility and still be machinable. For that reason, most of our castings are predominantly of ferritic matrix. It appears to us that there are many fields where this product can be applied.

Our experience to date has clearly justified the following conclusions: Producing ductile cast iron is not a process where one throws in a powder and, presto! the results are here. It is a process which should be used in foundries having meticulous technical control of all metallurgical and melting processes. To obtain sound castings, the problem of feeding must be thoroughly understood. If high hardness and pearlite for wear resistance are needed, obviously the ductile iron for this casting must be that, and not ferritic.

We have determined that better properties are obtained by treating with the magnesium alloy and inoculating with ferrosilicon afterwards. The inoculation with ferrosilicon can be done immediately. The lower the nickel content of the magnesium alloy, the better ductile properties are obtained. It can reasonably be expected that with the great amount of work being done on this problem, new alloys, new techniques for addition, and economics will be brought more nearly in line. High tensile strength and ductility are but two of the properties, while many others are equally, or more, valuable.

For those who embrace ductile iron as a means of correcting faults in metallurgy, cupola and foundry practice, many headaches are in store. For those who sell ductile iron for any and all uses, much trouble lies ahead for both the consumer and producer. In making pipe or castings of uniform light section that cool fairly fast, there are not many problems. For making a varied line of engineering castings, much spade-work is yet to be done.

We feel that an engineering application of ductile cast iron is from one to three years away from the first experiments with this material. Let us experiment wisely and make haste slowly.

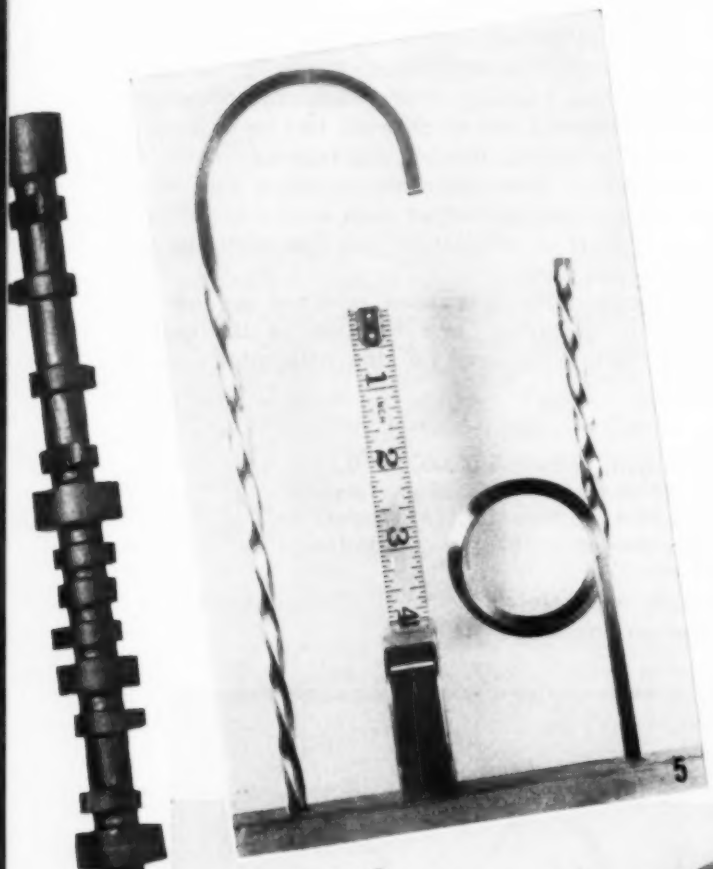


Fig. 5—Specimens from 8-in. class 150 ductile iron pipe. Chemical analysis: Si 2.89, S 0.006, Mn 0.27, P 0.062, TC 3.98, Mg 0.058. Mechanical properties: Wall tensile 67,305 psi, elongation 4.5 per cent, reduction in area 5.7 per cent. Mechanical properties of 1-in. keel block: Tensile 82,900 psi, elongation 7 per cent, reduction in area 6.1 per cent, bhn 192

Fig. 6—Engine camshaft made of ductile cast iron

Fig. 7—Showing vertical deflections in ring crushing test on 8-in. class 150 ductile iron pipe at left. Section in ring crushing test at right is standard 8-in. Class 150 super-deLavaud pipe

Fig. 8—Single turning 13 ft long obtained in machining ductile iron keel block. Chemical analysis: Si 2.95, S 0.013, Mn 0.32, P 0.039, TC 3.54, Mg 0.075, Ni 0.69. Mechanical properties: Tensile 103,200 psi, elongation 5.5 per cent, reduction in area 5.1 pert cent, bhn 241

IDEAS pay off in Cash

Suggestion systems, rewarding individuals for money-saving ideas, are becoming more widely adopted in industry. If properly handled, they can be of value to both the company and its employees. A system that has worked out well for one company is described here

By ROBERT H. HERRMANN
Associate Editor
THE FOUNDRY

Charles Zamiska of Cleveland Graphite Bronze Co. expresses surprise and pleasure over check for $4995.18. This is one-half his estimated award for suggesting an improved method of handling cores used in casting bearings. Shown below is the manual describing the company's suggestion system. It is distributed to all employees

"THERE must be a better way." How many times have you said that in the midst of some trying endeavor when progress seemed slow and tedious or when raw material waste or production costs were unduly high? Yes, there must be a better way. And when that better way is found, particularly at the Cleveland Graphite Bronze Co., Cleveland, it pays off to the fellow who had the bright idea which brought about improved methods of manufacture, or a better product.

Facilities enabling employees of this large manufacturer of bearings to submit their ideas through proper channels are well organized. Suggestion boxes are placed at many convenient locations throughout the plant and standard suggestion blanks and tracing paper for making any sketches or drawings necessary for presentation of the suggestion are furnished in a container attached to the box. The names of suggesters and amounts of money awarded are posted on a bulletin board. The bulletin board is brought up to date each month and presents a record of winners over a period of one year.

The company also has issued a printed booklet describing the suggestion system and presenting its rules. The most recently revised manual was mailed to the home of each employee in the fall of 1948, and copies of the manual are mailed to new employees as they join the company. George H. Thobaben, (*Please turn to page* 218)

Mechanized Foundry

Makes Farm Implement Castings

FROM the days of Tubal Cain, who used a pointed stick to scrabble the earth for corn, the food of mankind, directly or indirectly, has come from the earth. Despite the ever increasing demand for more food to meet the wants of a constantly increasing population, the evolution of mechanical farm equipment for many years lagged far behind the development of power-driven machinery in other fields of human activity.

In more recent years the situation has changed to a remarkable and gratifying degree. The farmer in the dell no longer is confined to the crude plow, the back-breaking scythe and sickle, and the spade and the hoe. From the gleaming car in the front yard to the array of ingenious mechanical devices in the huge modern barns and storage buildings, the farmer is in a position to work or play on a par with his urban contemporaries. Modern agricultural science has taught him how, and modern machinery has enabled him, to grow two blades of grass where one grew before, and to maintain even a greater increase from other seeds that fall on or into his prepared land.

While the farmer in the dell—and elsewhere—is doing quite well, that particular phase of the subject is outside the scope of this present description of methods and equipment employed at the gray iron foundry of the Ohio Cultivator Division, National Farm Machinery Cooperative Inc., Bellevue, O. This firm has been inventing, developing, building and distributing farm machinery for 65 years.

About a year ago, in the face of greatly increased demand and with the foundry pushed beyond ordinary capacity, the management decided on a radical change in operating methods. Under the old, usual and familiar foundry practice, a definite number of men filled all the available floor space with molds once a day. Obviously, if the same floor space could be utilized several times each day, instead of only once, the production of castings would rise in proportion. The company's engineering department, in collaboration with makers of foundry equipment, prepared the necessary plans.

Mechanical equipment was installed in the melting, sand preparation and distribution, molding and casting cleaning departments, and operators were instructed in their new duties. After the usual preliminary, experimental and bug extermination period, the foundry settled down to routine and has been clicking along at the anticipated production schedule, approximately three times the output under former conditions.

The coreroom, wash and toilet room and a well equipped sand laboratory, occupy space at the east end of the building. Small cores in wide variety are made on a battery of core blowing machines. Odd lots

Fig. 1—Molds are made, poured and shaken out on two parallel units.

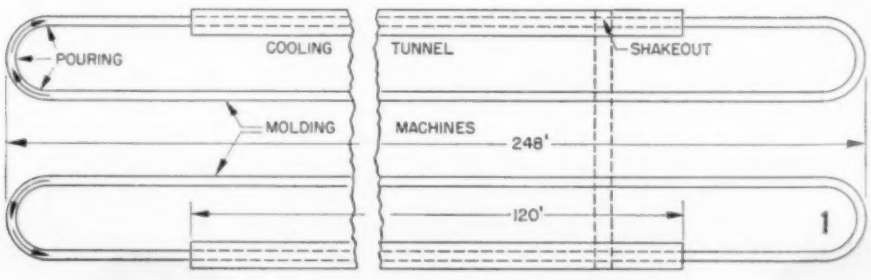
Fig. 2—Molds are poured continuously and weights and jackets are shifted as molds go around the turn

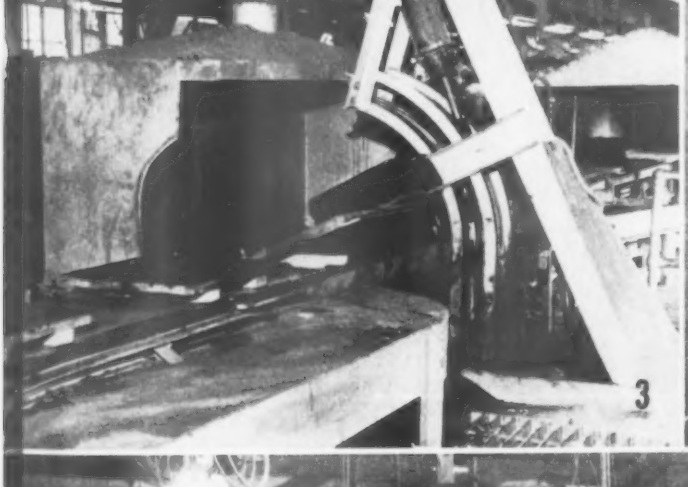
Fig. 3—Molds are shaken out automatically after they leave the cooling tunnel

Fig. 4—Hand ladles are dried in a small oven.

Fig. 5—Belt carries castings to grinding stands

By PAT DWYER
Engineering Editor
THE FOUNDRY





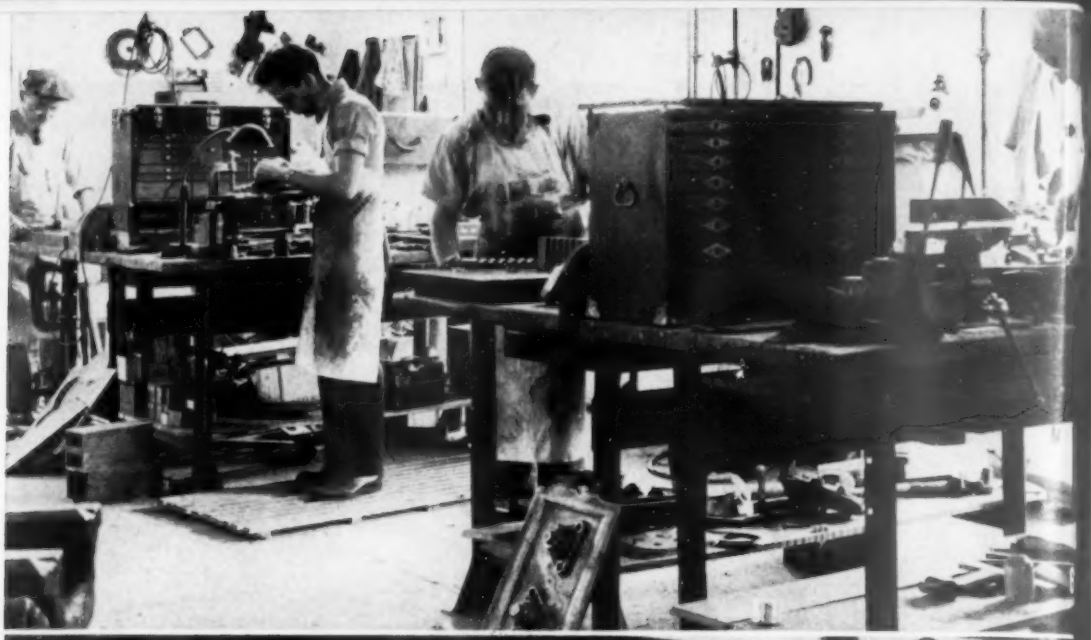


Fig. 6 — One corner of pattern shop

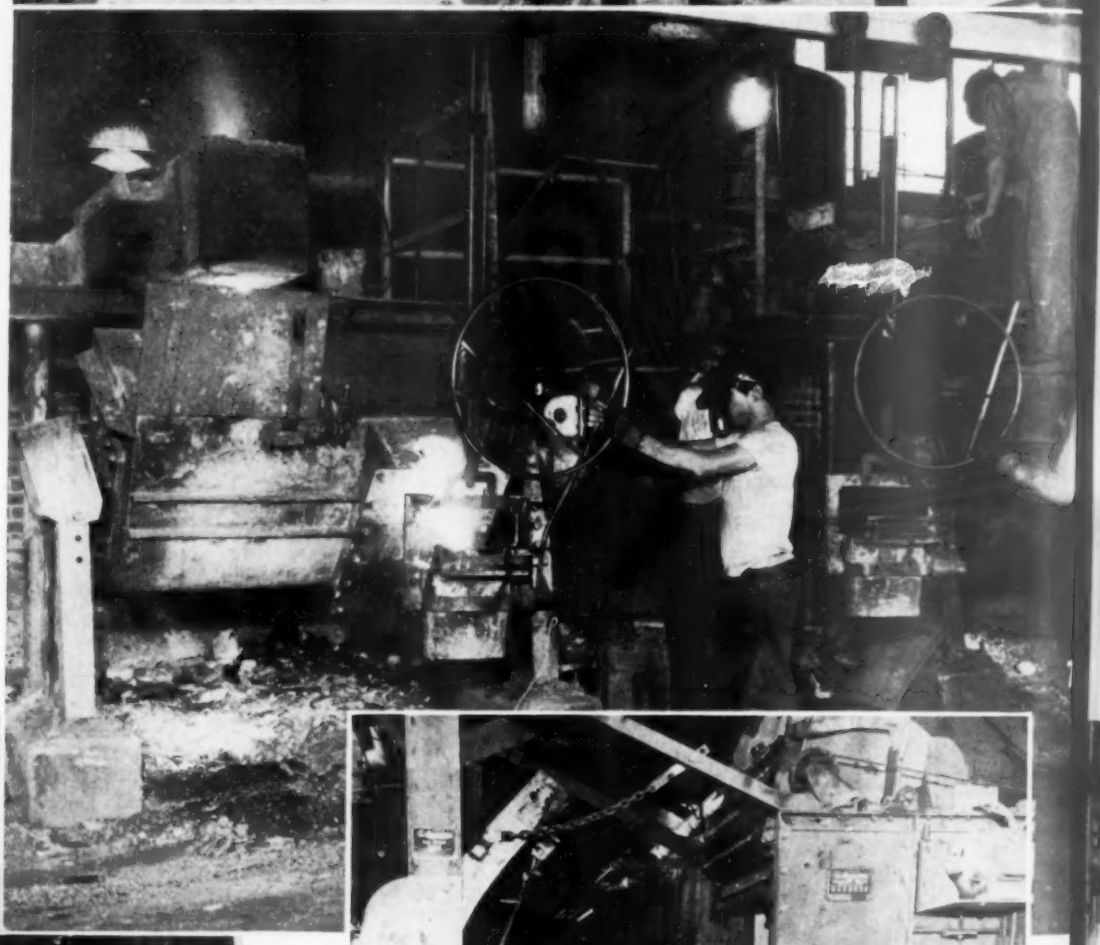
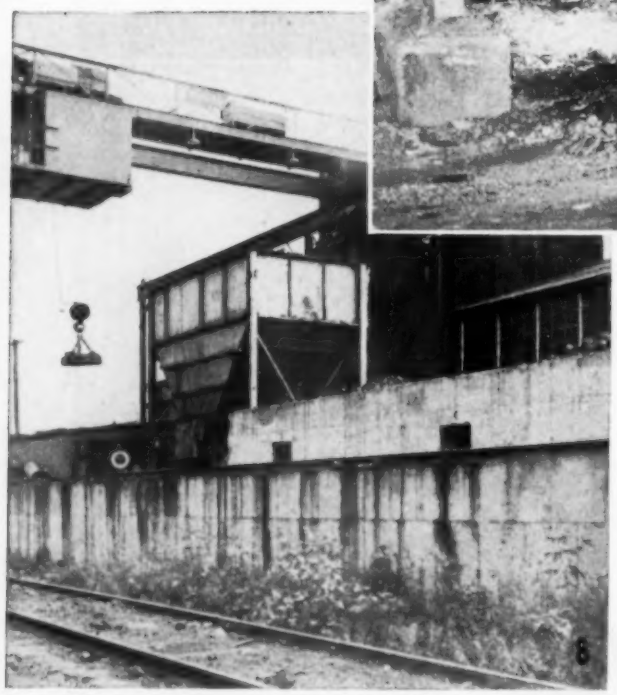
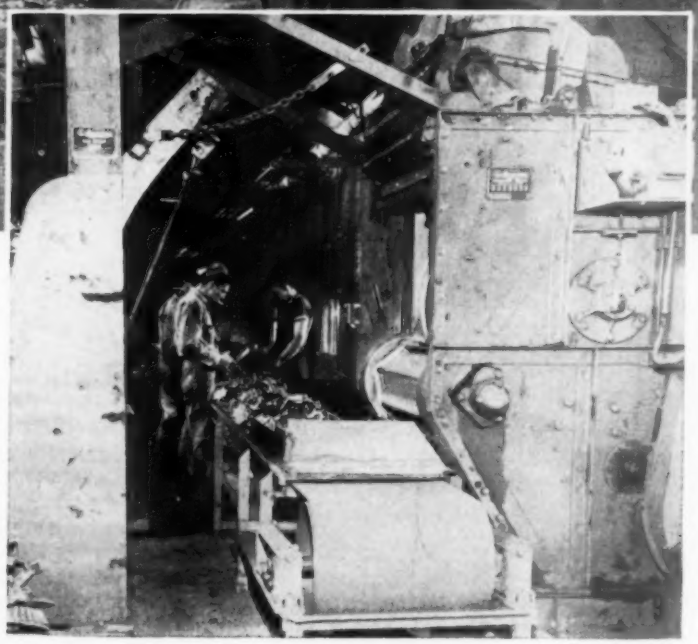


Fig. 7 — Bull ladles are filled from reservoir ladle

Fig. 8—Stock yard is spanned by gantry crane

Fig. 9—Airless blast unit discharges onto inspection belt





and short orders are made by hand on benches. A uniform oil-bonded sand is used for all the cores. Cores are dried in a vertical, gas-fired oven. The loaded plates are placed on swinging shelves at one side, carried aloft through the high temperature zone, and removed when the shelves return to floor level on the opposite side of the oven.

Space next to the foregoing is occupied by the cupolas, the pig molds and the necessary turn around area for the ladles suspended from the monorails. The center section of the foundry, as mentioned elsewhere, is taken up with the two conveyor units, where the molds are made, poured, cooled and shaken out. Remainder of the floor space is devoted to equipment for cleaning, grinding and sorting the castings.

Molds are made on two parallel conveyor units (Fig. 1), one moving clockwise, the other counter clockwise, occupying space approximately in the center of the building. While traveling in the same general direction from west to east, one conveyor turns to the right, while the other turns to the left at the pouring end, thus bringing the poured molds to the shakeout station, a short distance from the west end and on the outside of each conveyor line.

A battery of 30 molding machines, 15 to a side, occupies space between a depressed gangway and the inner leg of each conveyor unit. Standing on the lower level the operators can transfer the molds from the machines to the conveyor buggies, without bending or stooping. Individual hoppers supply sand to the two rows of molding machines. Prepared sand from a central sand preparation unit travels on a belt above the hoppers and is deflected to each hopper in such quantity as may be required to keep up with the activity of the operator working beneath. Average production of each machine operator is in the vicinity of 275 snap flask molds per day. In a few exceptional instances the record has touched the 400 mark.

Since the two conveyor units are alike in every respect, with the single exception that one turns to the right while the other turns to the left at the pouring end, a description of one will serve for both. Total length on a center line from end to end is 248 in length, is actuated by a 2-hp motor under push-button control. The cars run light from the shakeout, around the far end loop, and to the straight section immediately back of the molding machines. From here the load grows increasingly heavier as the molds are loaded on the cars. The heaviest load is in the vicinity of the pouring zone. At this point a number of attendants place aluminum slip jackets and cast iron weights on the molds. Other operators bring a constant supply of molten metal in 250-lb ladles suspended from a monorail that extends to and loops in front of the cupolas. A small hoist operated with one hand, and a side lever operated with the other hand, enable one man to handle each ladle.

Since the castings are light, the metal solidifies almost immediately. The attendants remove jackets and weights, and either set them temporarily on low benches, or transfer them to the incoming batch of molds from the molding station. The molds, stripped of jackets and weights, pass through a cooling tunnel 120 ft in length where an exhaust system removes steam and smoke and discharges the combination through long pipes extending through the roof.

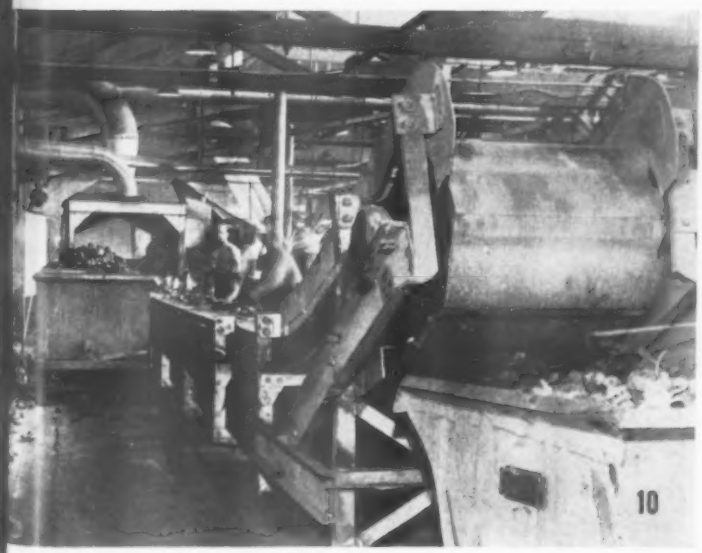


Fig. 10—Castings from the conveyor are transferred to steel tote boxes while gates, sprue and scrap travel over the end and fall into another tote box

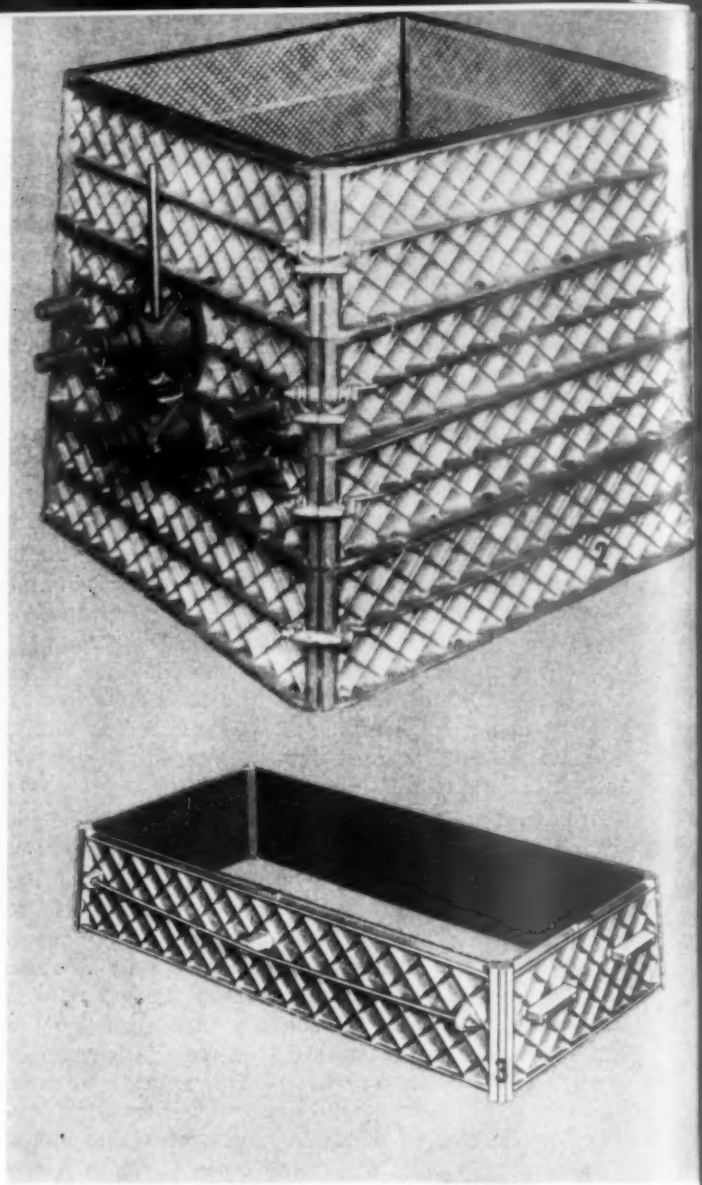
Molds Dumped Automatically

Near the outer end of the tunnel a small pneumatic hoist, with the lower end of the piston rod working in curved guides, catches the outer edge of the top pallet on each buggy in turn and tips it up. The blocks of sand slide off, while a row of pins on the low side of the pallet prevent the bottom boards from following the sand. Sand and castings fall onto a screen where the sand falls through to a belt leading to the sand preparation station. Castings, gates and sprues are carried on a conveyor which travels in a tunnel and serves both molding units.

Beyond the second unit, the loaded conveyor emerges from the tunnel and moves upward at an angle of 45 degrees. At the top of the incline the castings, scrap, sprue and gates fall onto a vibrating screen which removes any small amounts of adhering sand, and in many instances separates sprue and gates from the castings. The screen discharges onto a horizontal belt from which the various items are removed by men armed with tongs, or with long, light steel rods hooked at one end. Steel containers mounted on skids and designed to be handled either by lift truck or crane, are spotted in the vicinity. Castings are tossed into one, while gates and sprue are tossed into another. Containers are removed and replaced as often as necessary throughout the day.

Castings are cleaned in an airless blast barrel and discharged onto a long, wide horizontal belt, where a number of attendants pick out the different castings and load them into small, deep steel trays. The boxes are within the lifting capacity of the individual operator. They correspond in a general way to the "lugs" in which customers on the West Coast carry away their purchases from (*Please turn to page* 152)

Flasks AND Rigging FOR STEEL CASTINGS



Various types of flasks, jackets and bottom boards employed in the steel foundry for making different size castings are discussed in this first of two articles on the subject of flasks and rigging

By JOHN HOWE HALL
Consultant
Swarthmore, Pa.

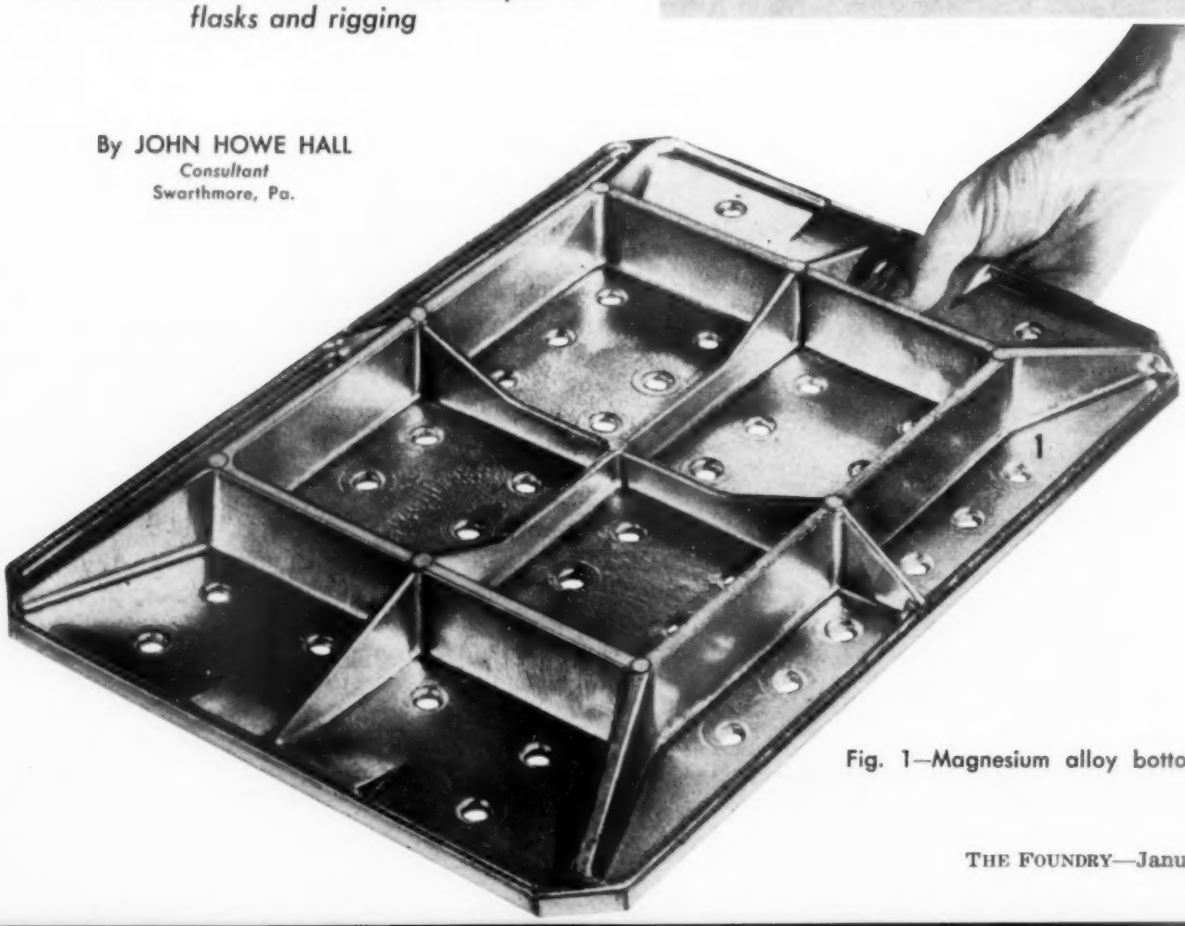


Fig. 1—Magnesium alloy bottom board

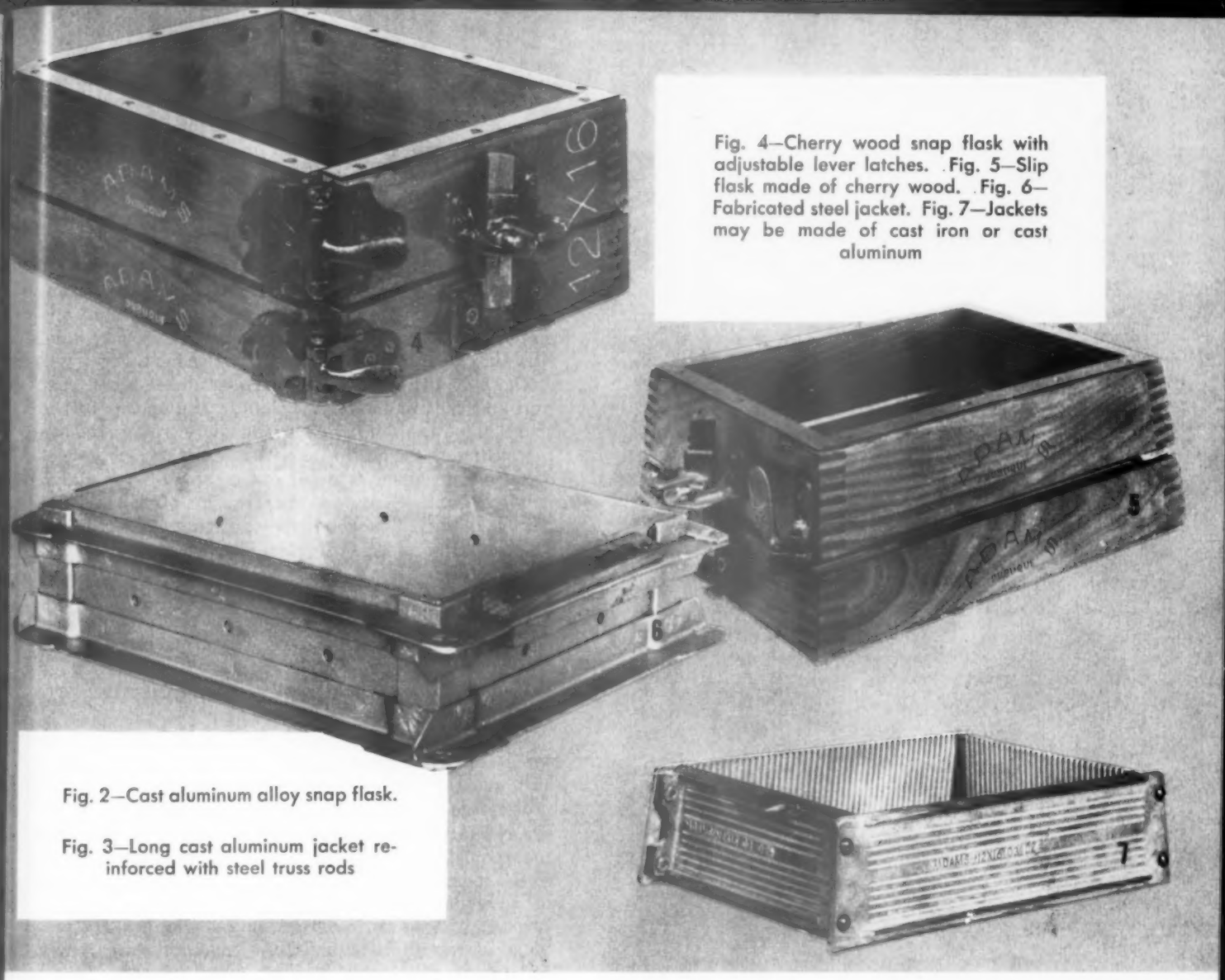


Fig. 2—Cast aluminum alloy snap flask.

Fig. 3—Long cast aluminum jacket reinforced with steel truss rods

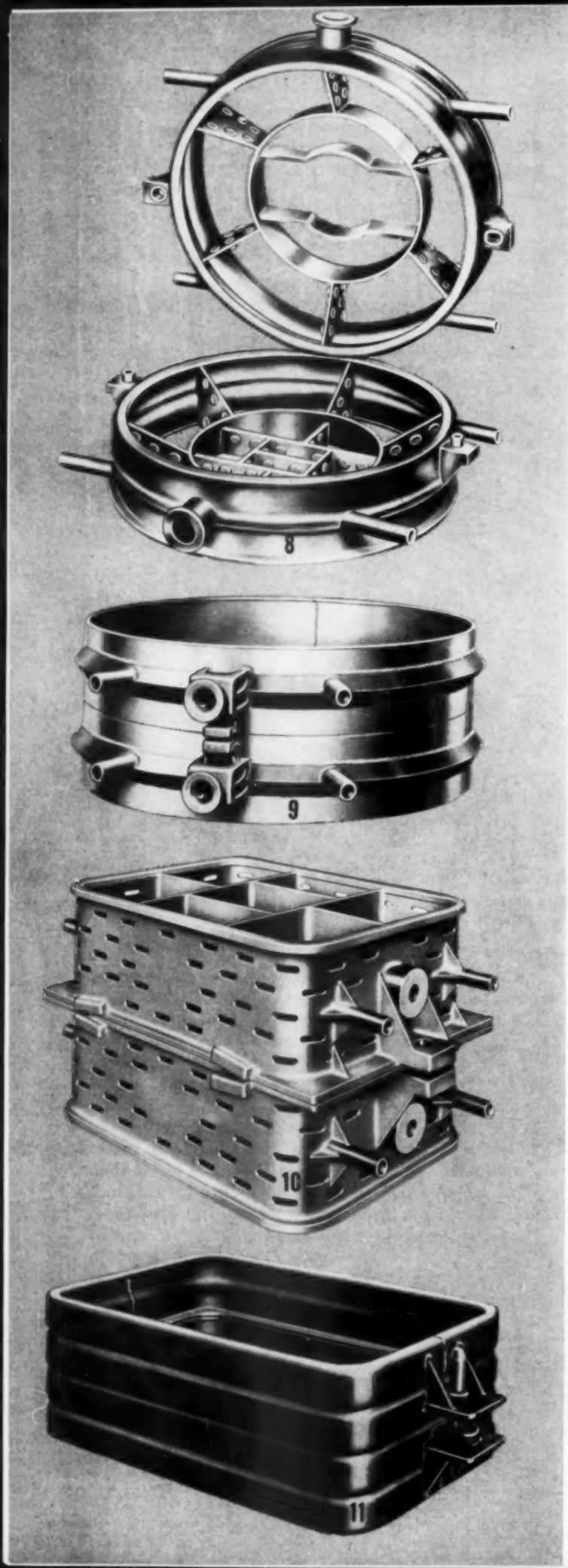
Fig. 4—Cherry wood snap flask with adjustable lever latches. Fig. 5—Slip flask made of cherry wood. Fig. 6—Fabricated steel jacket. Fig. 7—Jackets may be made of cast iron or cast aluminum

EQUIPMENT for making snap or slip flask molds, as described previously, (THE FOUNDRY, July, 1949), consists of the removable cope and drag flasks, the bottom boards and jackets, and the pattern plates on which the patterns are mounted. If loose split patterns are being used for hand molding on benches, they are laid on boards, generally of wood, in order to mold the drag. For one-piece patterns that are to be bedded in snap flask molds on the bench, no board, of course, is required.

For mounted patterns used to make snap or slip flask molds on jolt squeezers, hard wood pattern plates, adequately protected by metal strips around the edges, formerly were standard equipment, and still are employed widely. For mounting patterns that are to be used for producing great numbers of castings, however, aluminum or magnesium alloy plates, which do not warp and will greatly outlast wood, are usually preferred. Being light, they do not increase too greatly the weight the operator has to lift in rolling over drags, and they are not readily damaged by rough handling. Of late years, plywood boards, reinforced around the edges with metal bands, have come into use to some extent. Plastics so far have proved too brittle to be used without considerable reinforcement around the edges, and for the most part they are not so light as to have any advantage over aluminum and magnesium alloys. Steel plates may be somewhat heavy for snap-flask work.

To a certain extent, the same thing applies to the bottom boards on which the completed molds are set. The first cost of wood boards is lower than that of metal ones, but the former tend to wear out rapidly, especially when the layer of sand over them is thin, so that they are charred or even ignited by the heat of the castings. The cost of wood in recent years has become so high that light metal boards are being substituted to an increasing extent. In the past various composition boards were tried, but as a rule they were somewhat heavier than the wood ones.

The snap or slip flasks themselves were formerly always made of cherry or other hard woods, but over a period of years light alloys also have been used for the purpose. Alloy flasks weigh no more than wood ones, and if handled with reasonable care are prac-



tically indestructible in ordinary foundry operation.

In materials for slip jackets, the foundryman has the choice of wood, compositions of the asbestos type, sheet steel, cast iron or light alloy. Wood jackets tend to warp and catch on fire from molten steel spilled on them, so that their life at the best is short and their overall cost high. Composition sheets, of which jackets are sometimes made, require exterior bracing that makes it difficult to set the molds close together for pouring. Hot metal spilled on them tends to reduce the strength of the material, so that though they do not actually take fire, they are gradually ruined by the heat.

There is little to choose between sheet steel, cast iron and cast light alloy jackets in the matter of the space they take up. Unless heavily reinforced on the outside, so as to take up extra space, sheet steel jackets are apt to get out of shape from rough handling, and a careless operator may spoil a mold with a distorted jacket before noticing its condition. The cast iron and cast light alloy ones are more rigid and therefore retain their shape better than those made of sheet steel. Under rough handling, of course, cast iron jackets may be broken and rendered useless, but some foundrymen believe that this is a certain advantage, since a broken jacket will be discarded on the spot and no molds will be spoiled by men trying to use them.

For making molds other than snap or slip flask work, on molding machines of small and medium size, and for small floor work, many foundrymen prefer flasks made from rolled steel sections, which are reinforced in various ways so that they will have the requisite stiffness to stand up in rough service. The accompanying illustrations show various types of sections used for flasks of this sort. In some cases it will be noticed that outside flanges are provided at top and bottom of the cope and drag flasks, to engage small "C" clamps, while in other styles this feature is omitted. As a rule the lower edges of the cope have small inside flanges, or sand strips, to help hold up the sand when the rammed mold

Fig. 8—Circular cope and drag flasks with permanent bars designed for a specific job, and fabricated from rolled steel

Fig. 9—Circular flask with trunnions and 2-man lift handles

Fig. 10—Fabricated steel flask with perforated walls

Fig. 11—Another type of welded steel flask

Fig. 12—Steel flask with built-in grid

is lifted. In some cases, where the molds are lifted by hand, light alloy flasks are provided, especially in high production installations.

Bottom boards for work of this size are usually of wood, since if made of cast iron or reinforced steel plate, they would be inconveniently heavy to handle. In the smaller sizes, cast aluminum or the lighter alloys may be used to advantage.

It is generally advantageous to use what are called "ventilated" flasks, not only in the case of the comparatively small ones made of rolled steel or light alloy, but also in the large cast iron or cast steel flasks. The round or elliptical holes punched or cored through the flask do not greatly weaken the sections, which are usually amply strong to resist the stresses set up in pouring, and they considerably lighten the flasks. If dry sand molds are to be produced, the holes serve to allow the escape of steam from the sand, permitting faster and more thorough drying. When green sand molds are poured, the large quantities of water vapor and other gases evolved from the sand naturally find an easier passage to the atmosphere if the flasks are "ventilated."

Some authorities, notably the late George Batty, believed that the resistance of solid flask walls to the escape of mold gases so builds up the pressure in the molds as to lead to the formation of pin holes in the solidifying steel. The gases find an easier path of escape by entering the fluid metal, rather than forcing their way through the sand. Mr. Batty taught that when the layer of sand between the casting and the flask walls and bottom board is thin, it is almost essential that ventilated flasks and boards be used. However that may be, the holes in the flasks certainly promote the escape of gases, and thus tend to prevent the sudden and explosive ignition of mixtures of gas and air trapped against the bottom boards.

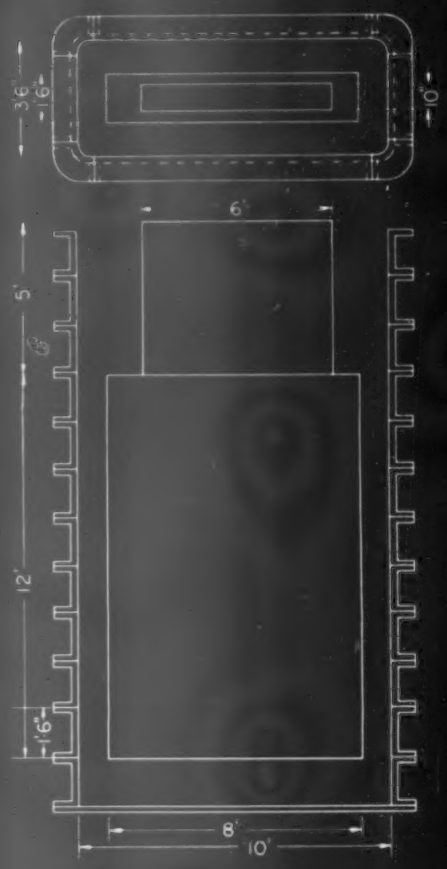
This, incidentally, is one of the reasons that grids are to be preferred to bottom boards, even when they have to be put on and bolted down after a mold is rammed up, so that (*Please turn to page* 205)

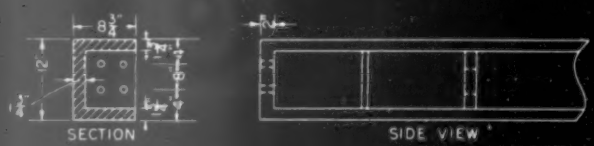
Fig. 13—Cross sectional view of rolled steel used in one type of flask, showing reinforcing ribs

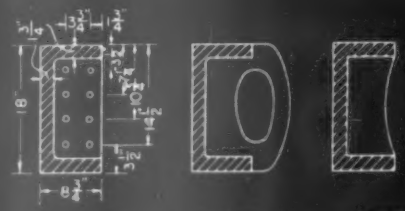
Fig. 14—Slip flask made of cast magnesium alloy

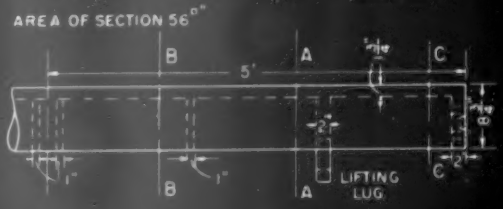
Fig. 15—Sketch showing arrangement of mold and casting

Fig. 16—Sketch showing various details of cast steel sections for making large flasks. Side pieces usually are 1,2,4,6,8,10 and 12 ft long and fastened together with ⅞-in. diam bolts through 1-in. diam holes



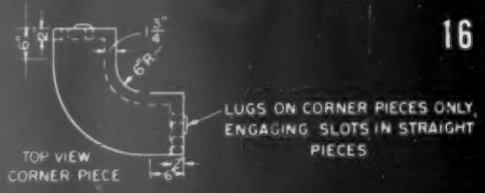






HALF TOP VIEW - 10' SECTION

NUMBER AND LOCATION OF STIFFENING BRACES AND LIFTING LUGS VARIES WITH LENGTH OF SECTION



Modern practice in Investment C

Effect of gating, mold temperature and metal temperature on mechanical properties of castings is discussed in this third and concluding article on investment casting practice. Previous articles were presented in the November and December issues

A NUMBER of metallurgical factors must be considered in producing investment castings, such as gating, mold temperature and metal temperature. Gating includes getting the metal into the mold cavity in a manner which will assure sound castings with good mechanical properties, and passages for the escape of air or mold gases, which, due to the tightness of the ceramic, cannot escape through the mold walls.

Many believe that very thin gates and small risers can be used on investment castings which proportionately are much smaller than those used on sand castings. This quite often leads to serious trouble, particularly in regard to mechanical properties. The author has previously shown[7] that with plaster castings it is possible to increase tensile 13 per cent and elongation 50 per cent and reduce microshrinkage by increasing the size of gates and risers.

Furthermore, it is often stated that investment test bar properties are lower than sand cast values. This is not true if a proper test specimen is used and proper gating employed. Since investment castings are smaller than sand castings, it is only fair that a test specimen smaller than 0.5-in. diameter be used. Therefore, the standard tensile specimen for investment casting is 0.25-in. in diameter and has 1-in. gage length. Usually ⅜-in. threaded shoulders are cast on the specimen and the bar pulled as cast (see Fig. 9). Using this specimen tensile properties equivalent to sand cast properties can be obtained. Pouring temperatures can be kept lower than for sand casting, and fine-grained, sound castings can be produced.

Nonferrous Alloy Gating—In order to obtain best results with these alloy, a wide range of mold and metal temperatures is necessary. Two types of test bar gating were tried: direct pour, and indirect pour. These are shown in Figs. 6 and 7, respectively. In each case external pressure of 20 pounds was applied immediately after pouring.

First, aluminum alloys were tried. Nominal compositions of the alloys used are shown in Table I.

From the data in Table II it can be seen that all of the aluminum alloys tested gave best results with direct pouring.

Using the direct-pour gating, further tests were made with two aluminum alloys to determine the effect of pouring temperature on tensile properties of test specimens. The two alloys showed very little sensitivity to pouring temperatures used, as shown in Table III. However, 1350° F was too high for 195 alloy and gave very bad results. In general, 1300° F appeared to be satisfactory for both.

The same two aluminum alloys were used to determine the effect of mold temperature on tensile properties of test bars. The two alloys showed a different degree of sensitivity to mold temperature, as shown by Table IV. The aluminum-copper alloy showed definite increase in strength when mold temperature was reduced from 400° F to room temperature. The aluminum-zinc-magnesium alloy showed very little change with variation in mold temperature.

Similar tests were conducted on copper-base alloys. The nominal chemical composition of the alloys used are shown in Table V. Table VI shows the sand cast requirements for the alloys tested.

The effect of gating on tensile properties is shown in Table VII. Again as in the case of aluminum alloys, the copper base alloys gave best results using direct pour methods.

The effect of metal temperature is shown in Table VIII. In each case there was an optimum pouring temperature which gave best combination of tensile and elongation. This was 1650° F for silicon brass, 1950° F for 85-5-5-5, and 1850° F for beryllium copper. When pouring temperature was too low, dross remained in the bars, so pouring ranges must be selected to avoid this condition.

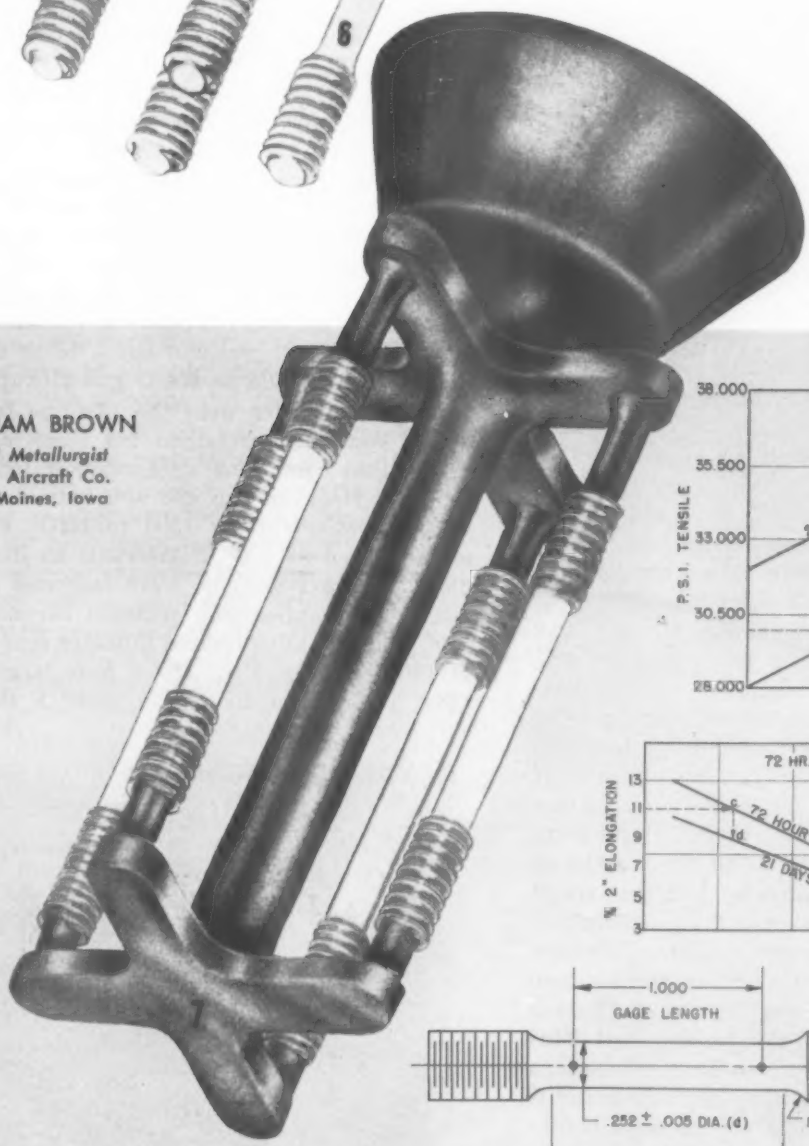
Table IX shows the effect of mold temperature on tensile properties. The 85-5-5-5 alloy showed a tendency to trap tough oxide film when mold temperature was too low. The other alloys showed little variation in properties with decreasing mold temperature, and, in general, 900° F mold temperature seemed to be satisfactory for all of these alloys.

Manganese bronze was the only alloy tested which could not be made to produce uniform and satisfactory results. If tensile was satisfactory, elongation was too low. If elongation was satisfactory, tensile

Casting

Fig. 6—Direct-pour test bars of this type showed shrinkage in 75 per cent of the cases. Indirect pouring, as illustrated in Fig. 7, gave improved though not consistently good results. Complete elimination of shrinkage was provided by the gating method shown in Fig. 24

By HIRAM BROWN
Chief Metallurgist
Solar Aircraft Co.
Des Moines, Iowa



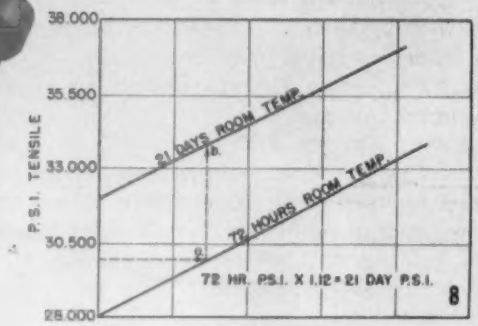
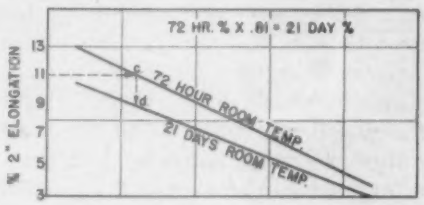


Fig. 8 — Effect of room temperature aging on physical properties of 40E alloy



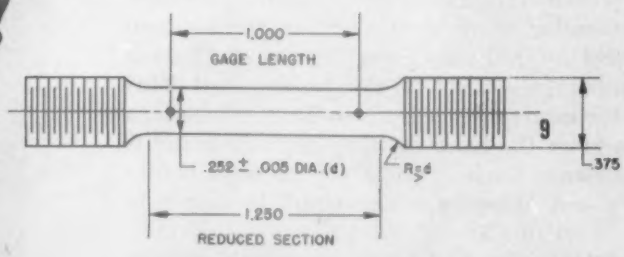
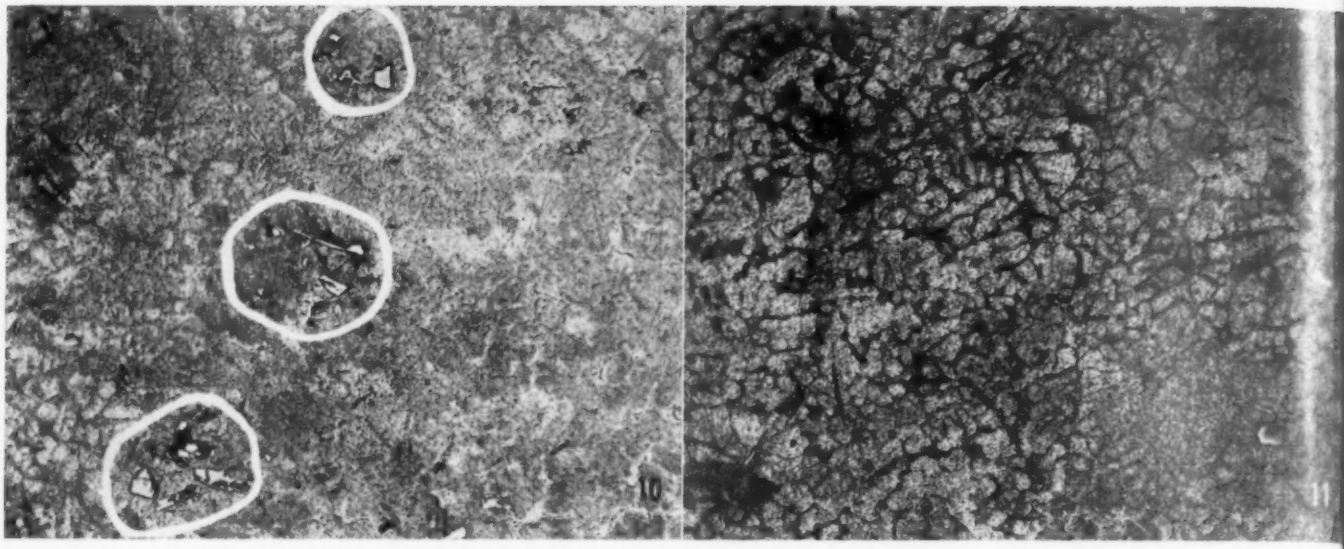


Fig. 9—Investment cast test specimen



Investment Casting

was low. Table X shows typical examples of this. Numerous specimens were cast but the answer to the erratic results was never found. The only tangible fact uncovered was that, due to the excessive drossing of the alloy, it was necessary to use indirect pouring. The bars with direct pouring were always badly drossed. Variation of metal or mold temperature did not seem to help at all.

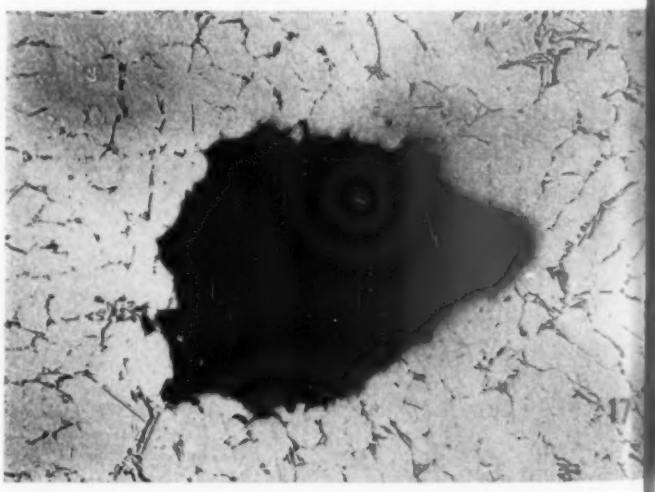
When 85-5-5-5 bars were removed from the mold they had a hard, black skin, probably due to reaction with gypsum. A dip in hot nitric acid removed the scale and left a very smooth surface on the castings. This scale did not appear to be harmful to tensile properties.

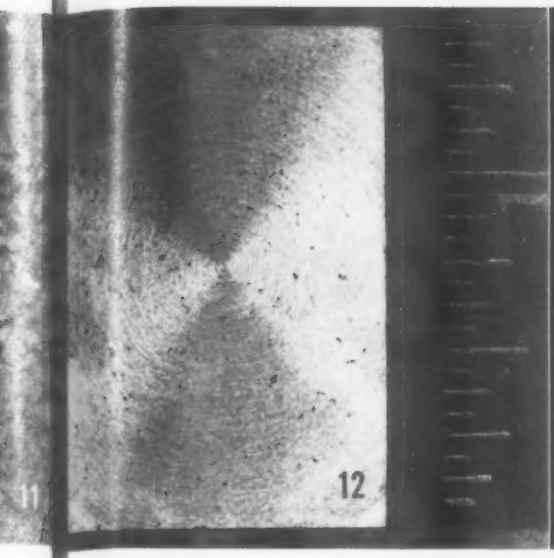
Lipson, Markus, and Rosenthal[8] have shown that a wide range of mechanical properties can be obtained by quenching copper-base alloys by dumping the molds into cold water.

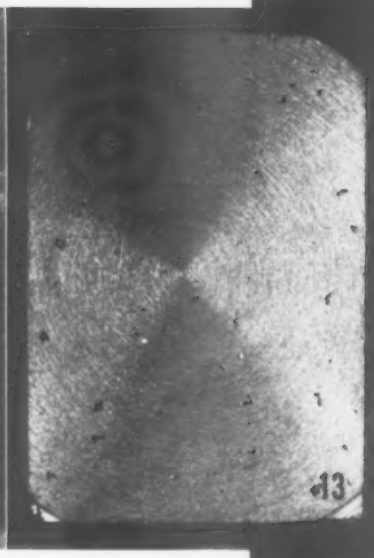
In casting 40E aluminum, one unusual fact was noted. In every case, test bars which had not less than 28,500 psi tensile after three days at room temperature, achieved at least 32,000 psi tensile after 21-days' room temperature aging. Similarly, test bars which had not less than 3.75 per cent elongation after three days at room temperature, had at least 3 per cent elongation after 21-days' room temperature aging. If the tensile strength after three days at room temperature was multiplied by 1.12, the result was within a few hundred pounds of the tensile which could be expected after 21 days at room temperature. If elongation after three days at room temperature was multiplied by 0.81, the elongation after 21 days at room temperature could be closely predicted. This permitted a chart to be drawn so that predictions could be made on the basis of three-day aging and it was not necessary to hold parts for 21 days before final testing and shipment. The chart is shown in Fig. 8.

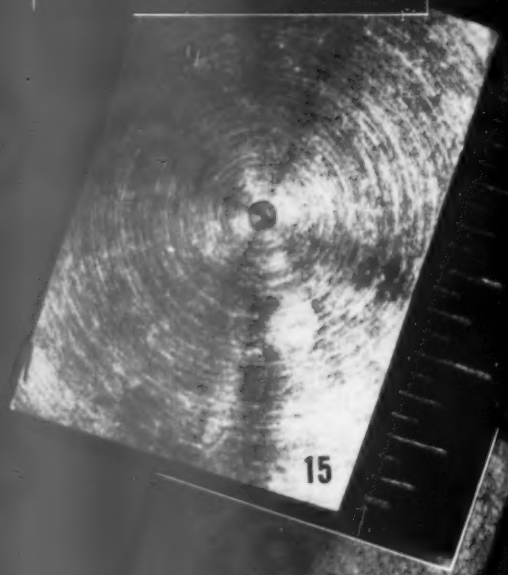
Micro-examinations were made of 40E aluminum test bars after pouring 1250° F metal into molds at 600, 500, and 400° F, respectively. The macrograin of the 600° F bars was coarser than that of the 500 and 400° F ones The macrograin of 500° F bars appeared to be finer than that of the 400° F bars, but micro-examination showed that the dendritic size in the 400° F bars was finer than that in the 500° F ones. Metal in the 600° F mold showed more particles of what appeared to be aluminum-magnesium complex than did the 500° F ones, and the 400° F ones had only a small amount of this constituent. Also, the 600° F metal had more shrinkage than did the 500° F metal, and the 400° F metal had very little shrinkage. Both of these conditions are shown by Figs. 10 and 11.

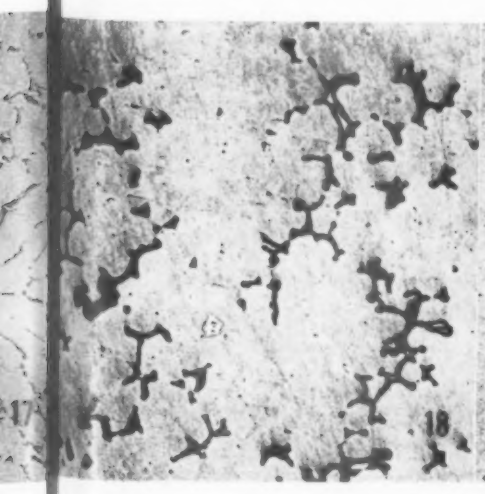
Tests were made to see if gas pickup and pinhole porosity tendencies were the same as for sand castings. The alloys retained the same characteristics except that conditions were exaggerated by the slow cooling. Heats of 355 and 40E aluminum were heated progressively from 1300 to 1800° F, with specimens poured at 100° F intervals as it cooled. Test blocks 1½ x 1 x ½ in. were cast and machined for visual examination and polished for micro-examination. The 355 alloy formed pinholes even when poured at 1400° F (Fig. 12). Holes were larger at 1800° F (Fig. 13). After cooling to 1400° F the holes were











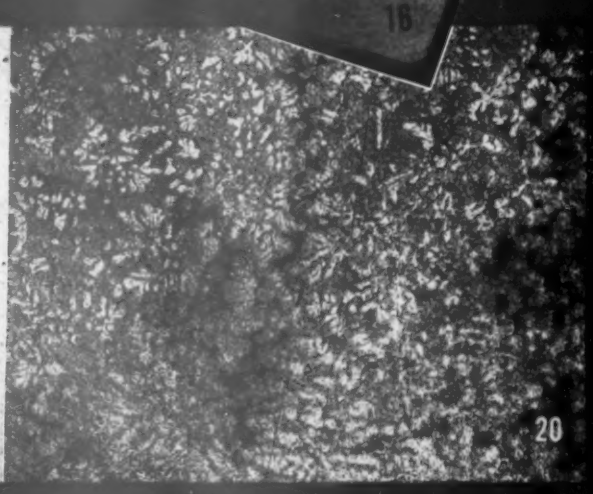


Fig. 10—Investment cast 40E aluminum, X50. Etched 20 sec 10 per cent NaOH. Flask temperature 600°F, metal temperature 1300°F. Circled particles believed to be Al-Mg complex

Fig. 11—Investment cast 40E aluminum, X50. Etched 20 sec 10 per cent NaOH. Flask temperature 400°F, metal temperature 1300°F.

Figs. 12-14—Investment cast 355 aluminum as machined, showing pinhole porosity. Metal temperature 1400°F in Fig. 12; 1800° in Fig.13; heated to 1900°F and cooled to 1400°F before pouring in Fig. 14.

Figs. 15-16—Investment cast 40E aluminum as machined. Metal temperature 1400°F in Fig. 15 with no visible porosity. Temperature 1800°F in Fig. 16 which shows no pinholes but tears from tool in areas later shown to be microporosity

Fig. 17—Investment cast aluminum, X50, unetched. Typical pinhole porosity shown

Fig. 18—Investment cast aluminum, X50, unetched. Internal shrinkage resulted from lack of feeding. Riser broke off while metal was semimolten

Fig. 19—Investment cast aluminum, X50, unetched, showing large gas hole surrounded by microporosity

Fig. 20—Investment cast aluminum, X50, etched 20 sec 10 per cent NaOH. Shrinkage caused by lack of feeding. Leak in connection prevented adequate air pressure

still present but more scattered and smaller than at 1800° F (Fig. 14). The 40E showed no pinhole porosity at either 1400° F (Fig. 15) or 1800° F (Fig. 16). Micro-examination showed that the gas in 40E was present as microporosity which could be seen only by microscope or x-ray. Both alloys showed increased grain size as temperature increased and the original fine grain did not reappear when the metal cooled.

Fig. 17 shows a typical pinhole. Note the rounded appearance all around the hole which is typical of pinhole porosity. Contrast this with Fig. 18 which shows shrinkage due to lack of feeding. In this case the riser broke off while still semimolten and was unable to feed the casting. Note how the defects tend to eat into the dendrites with finger-like formation. Fig. 19 shows a large gas hole surrounded by many small, dark areas of microporosity. Fig. 20 shows another shrinkage area in aluminum alloy caused by poor feeding. In this case there was an air leak and insufficient pressure was developed. Note, again, finger-like structure of the defect.

Use Special Gating System

Some effort was made to tie in the results of the tests with the gating of actual castings. It was found that for small castings it was best to use the direct-pour method by using tree type set-ups consisting of one or more down sprues to which were attached at a slight angle as many castings as could be accommodated. Each casting was attached to the down sprue by a slender gate (Fig. 21).

For large castings ½-in. or more thick and 3 in. or more long, it was found best to use indirect pouring methods whereby the metal entered the casting at the bottom. At the top of the casting was placed another gate to allow escape of air during pouring and which acted as a "hot shot" at the end of the pour to supply hot metal at the top of the casting where it is needed during solidification (Fig. 22).

If bottom gating is not used on large castings and air vents not supplied at the top of the mold, air is likely to be trapped in the cavity and will appear as blows, non-fills, or dendritic, crystalline, rough surface appearance on the casting. Sometimes the top gate may be omitted if adequate venting is supplied as shown in Fig. 23. Using this method of indirect pouring castings up to 1½ in. thick and 6 in. long, or even solid elbow shapes can be successfully cast.

Ferrous Gating—Stainless type AISI 316 was used for several test bar experiments. Direct pouring set-up (Fig. 6) showed shrinkage in 75 per cent of the bars x-rayed. This shrinkage appeared in the shoulder sections which were farthest away from the pouring lip of the mold. The bars with shrinkage failed to meet tensile requirements. Indirect pouring (Fig. 7) was better than direct, but did not consistently give bars which would meet ten- (*Please turn to page* 182)

Fig. 21—Tree type of set-ups
Fig. 22—Indirect pouring arrangement with top and bottom gates
Fig. 23 — Indirect pouring through bottom gate only
Fig. 24—U type set-up

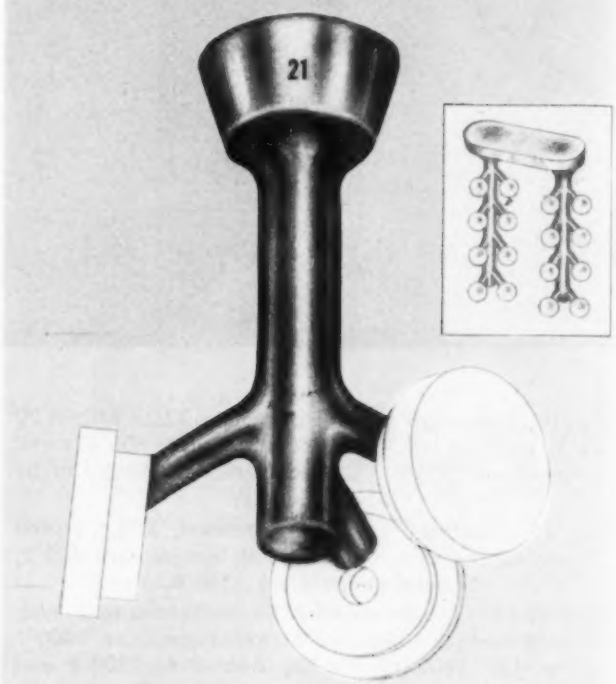


TABLE I — Nominal Chemical Composition of Aluminum Alloys Used

Alloy	Cu	Si	Mn	Zn	Cr	Ti
195	4.5	0.8	..	..	..	..
355	1.3	5.0	0.5	..	..	..
40E	..	..	0.5	5.5	0.5	0.2

TABLE II—Tensile Properties vs. Type of Gating of Test Bars

Alloy	Condition	Gating	Tensile, psi	Elongation, % in 2"
195	As cast	Direct pour	20,200	2.6
195	As cast	Indirect pour	16,400	1.1
355	As cast	Direct pour	26,400	2.0
355	As cast	Indirect pour	24,760	2.0
40E	3 days room temp	Direct pour	31,300	10.0
40E	3 days room temp	Indirect pour	30,000	10.0
40E	10 days room temp	Direct pour	35,000	11.0
40E	10 days room temp	Indirect pour	33,400	10.0

TABLE III — Effect of Metal Temperature on Tensile Properties Using Direct Pour

Alloy	Metal Temp, ° F	Tensile, psi	Elongation, % in 2"
195 As cast	1350	13,000*	1.0*
195 As cast	1325	22,500	2.5
195 As cast	1300	22,800	4.0
195 As cast	1275	22,700	3.5
195 As cast	1250	22,100	4.0
40E 3 days room temp	1350	32,200	15.5
40E 3 days room temp	1325	31,600	13.5
40E 3 days room temp	1300	31,900	13.5
40E 3 days room temp	1275	31,800	13.0
40E 3 days room temp	1250	31,400	14.0
40E 10 days room temp	1350	33,250	12.0
40E 10 days room temp	1325	35,200	11.0
40E 10 days room temp	1300	35,100	11.0
40E 10 days room temp	1275	34,600	12.0
40E 10 days room temp	1250	35,150	11.0

* Bars had coarse, dendritic structure.

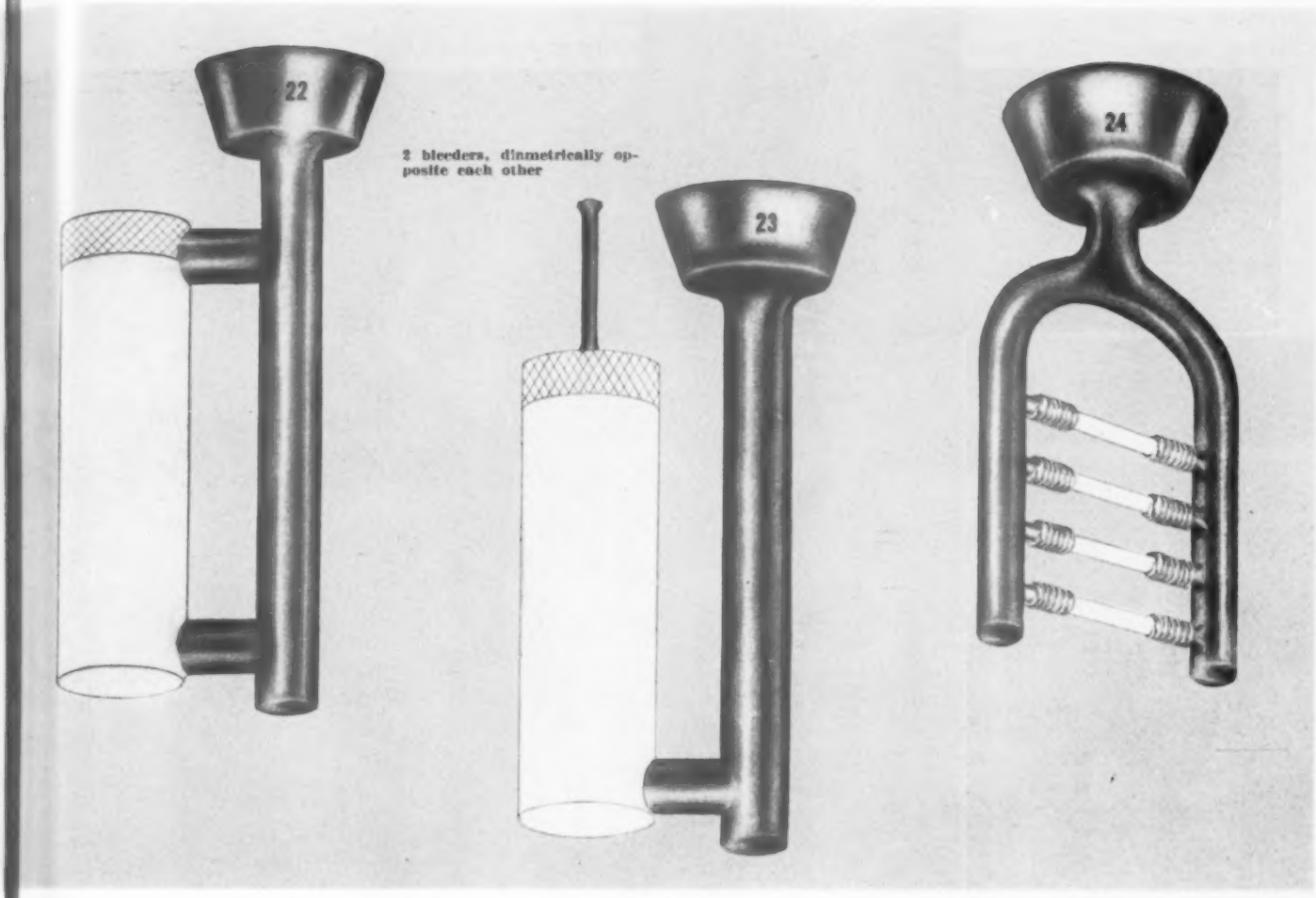


TABLE IV—Effect of Mold Temperature on Tensile Properties Using Direct Pour

Metal	Metal Temp, °F	Mold Temp, °F	Tensile, psi	Elongation, % in 2"
195 As cast	1300	400	19,400	4.0
195 As cast	1300	Room temp	23,850	3.0
40E 3 days room temp	1300	400	29,300	11.5
40E 3 days room temp.	1300	Room temp	29,850	12.0
40E 10 days room temp	1300	400	34,000	11.5
40E 10 days room temp	1300	Room temp	33,600	10.0

TABLE V — Nominal Chemical Composition of Copper-base Alloys Used

Alloy	Zn	Sn	Pb	Si	Mn	Al	Be	Co	Fe
Silicon brass	14	..	..	4	..	..	..	..	..
85-5-5-5	5	5	5	..	..	..	..	..	..
Beryllium copper	..	..	..	..	..	..	2.0	0.5	..
Manganese bronze	38	..	..	..	1.0	1.0	..	..	1.5

TABLE VI—Sand Cast Specifications for Copper-Base Alloys Shown in Table V

Alloy	Min Tensile, psi	Min Elong., % in 2"
Silicon brass	60,000	16
85-5-5-5	30,000	20
Beryllium copper	80,000	20
Manganese bronze	65,000	20

TABLE VII—Tensile Properties vs. Type of Gating of Test Bars

Alloy	Gating	Tensile, psi	Elongation, % in 2"
Silicon brass	Direct	72,000	30.7
Silicon brass	Indirect	71,000	28.7
85-5-5-5	Direct	39,200	39.7
85-5-5-5	Indirect	40,000	38.2
Beryllium copper	Direct	82,500	24.0
Beryllium copper	Indirect	75,800	16.5

TABLE VIII—Effect of Metal Temperature on Tensile Properties Using Direct Pour

Metal	Metal Temp, °F	Tensile Strength, psi	Elongation, % in 2"
Silicon brass	1750	64,700	29.0
Silicon brass	1700	66,200	27.0
Silicon brass	1650	65,700	29.0
Silicon brass	1600	62,500*	11.0*
85-5-5-5	2050	36,000	36.0
85-5-5-5	2000	37,300	41.0
85-5-5-5	1950	38,700	40.0
85-5-5-5	1900	35,500*	28.0*
Beryllium copper	2000	78,750	26.5
Beryllium copper	1950	77,850	28.0
Beryllium copper	1850	81,000	29.0

* Dross in bars

TABLE IX—Effect of Mold Temperature on Tensile Properties Using Direct Pour

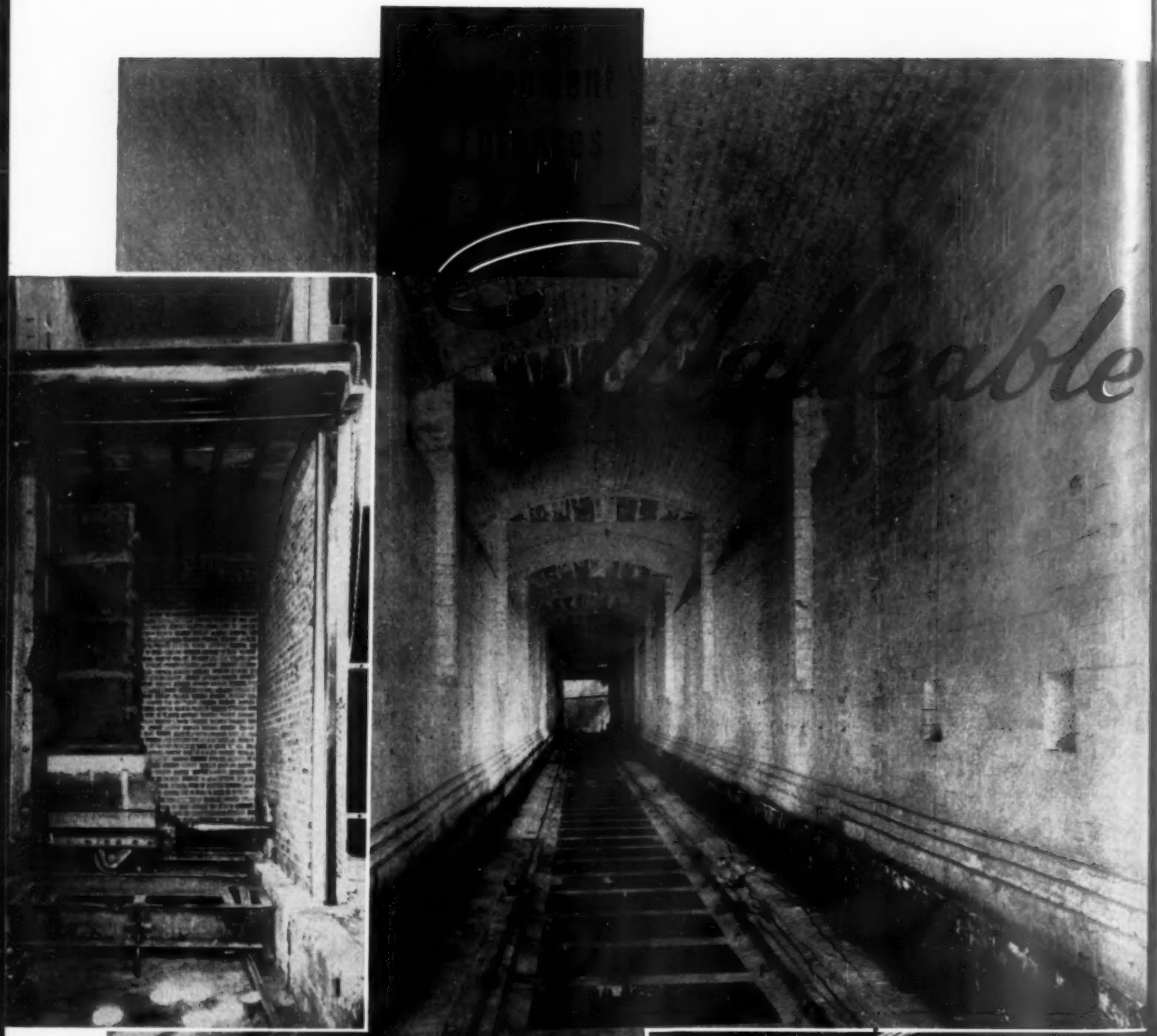
Metal	Metal Temp, °F	Flask Temp, °F	Tensile, psi	Elongation, % in 2"
Silicon brass	1700	900	70,870	28.25
Silicon brass	1700	Room	74,400	27.0
85-5-5-5	1950	900	36,600	27.0
85-5-5-5	1950	Room	24,000*	9.0*
Beryllium copper	1850	1100	83,500	21.5
Beryllium copper	1850	900	84,500	24.0
Beryllium copper	1850	Room	83,000	28.0

* Bars contained dross

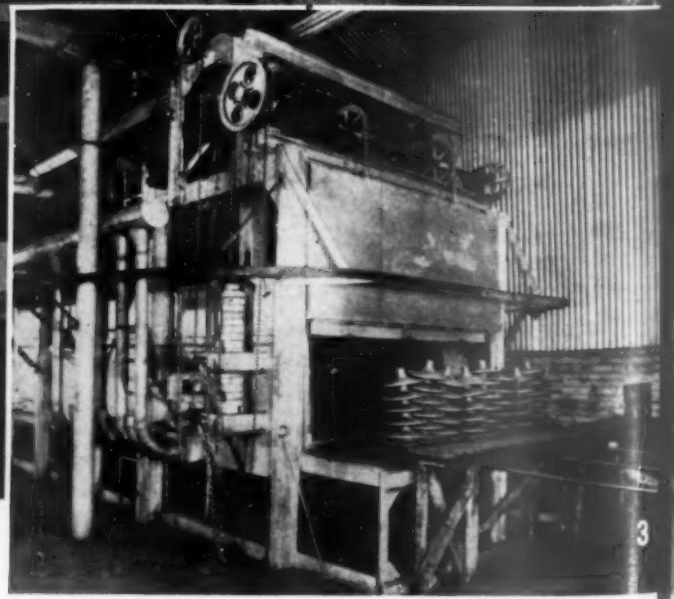
TABLE X—Effect of Gating on Tensile Properties of Manganese Bronze

Gating	Metal Temp, °F	Mold Temp, °F	Tensile, psi	Elongation, % in 2"
Direct	1850	900	71,500*	16.4*
Indirect	1850	900	74,500	20.5
Direct	1850	900	58,800*	15.2*
Indirect	1850	900	63,790	26.5

* Bars contained dross



2



3

The authors discuss the various factors which have permitted more efficient and more rapid annealing of malleable iron castings. Operation of typical equipment currently employed in malleable iron foundries is described

By C. H. MARTIN
Vice President in Charge of Chicago Office
and H. J. HAMMOND
Metallurgical Engineer
Holcroft & Co., Detroit

Iron Annealing

Fig. 1—Loaded car being pushed by hydraulic ram into oven shown in Fig. 2. For protection against scaling, work is packed in cast iron boxes shown stacked on car

Fig. 2—Interior of continuous car-type oven, fired with gas, oil or powdered coal through ports on each side

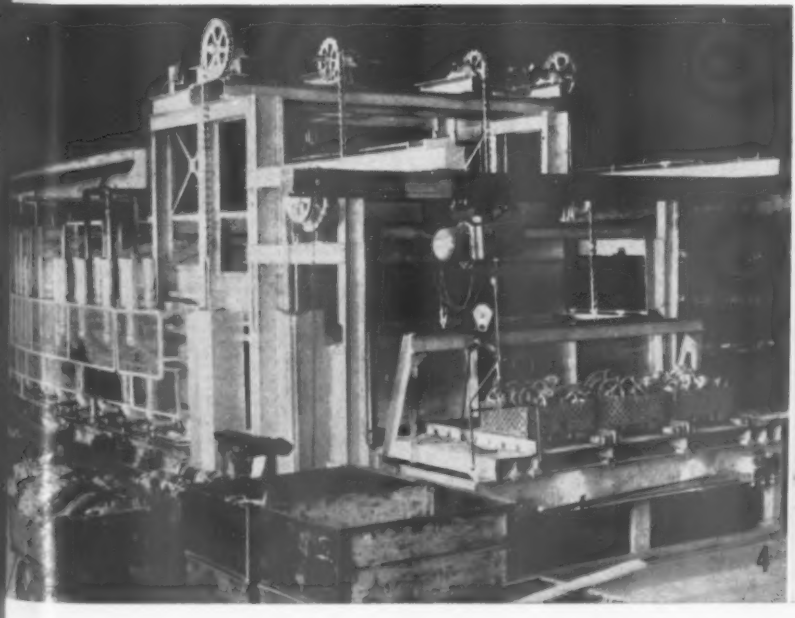
Fig. 3—First continuous malleable annealing furnace using light-weight refractories, inert gas atmosphere and electric heating, built in 1934. View is from charge end

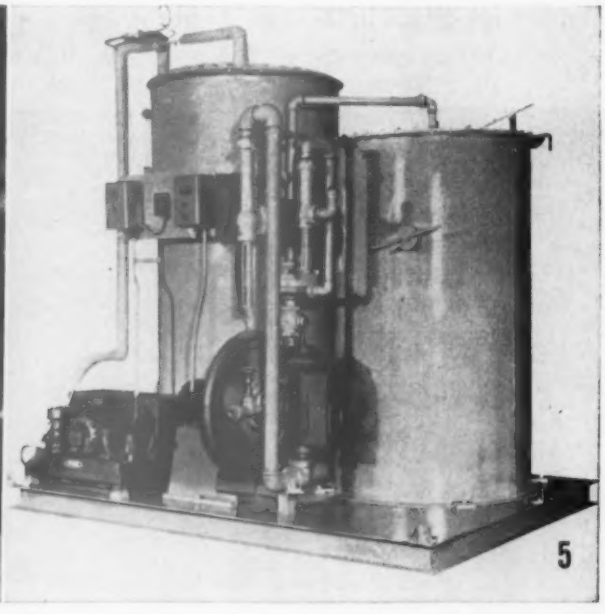
Fig. 4—First continuous controlled-atmosphere malleablizing furnace heated by gas-fired radiant tubes

Fig. 5—Typical gas generator for making protective furnace atmosphere gas for malleable annealing. Refrigerating unit and water tower are at left, combustion chamber at right

MALLEABLE iron castings are made of white cast iron, which has nearly all of its carbon content in the form of cementite (iron carbide). Thus, in the as-cast condition, they are extremely hard and brittle. To give such castings their well known properties of toughness, strength and ductility, they are subjected to the malleable annealing process, whereby practically all of the carbon is changed from the combined form to finely dispersed particles of free carbon in a matrix of nearly pure ferrite. This is accomplished by first holding the work at a temperature of about 1750° F until the cementite breaks down to release the carbon, then cooling slowly from above 1400° F to permit the desired growth of carbon nodules.

The speed with which this process can be performed depends on the analysis of the iron, the design of the annealing equipment and the size and shape of the castings. Metallurgical research has permitted notable time savings through the introduction of fast-annealing, high-silicon irons, and modern furnace design has taken advantage of these possibilities by providing units which in many cases will complete the malleablizing process in as little as 14 hours, compared with the four to ten-day period formerly required. In addition, substantial economies have been obtained by eliminating the massive pots formerly used to cover the castings; by the introduction of automatic handling devices: and by designing equipment for particular job requirements.





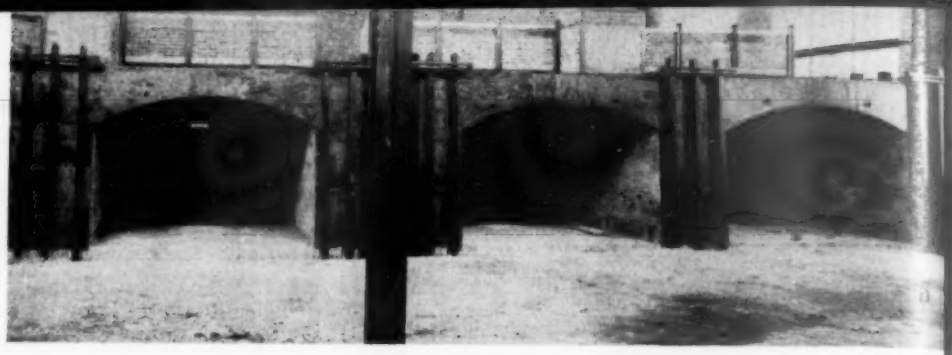


Fig. 6 — Row of direct-fired batch-type annealing ovens installed in 1916. These ovens still serve satisfactorily for long-cycle annealing of heavy castings of low-silicon iron

Fig. 7—Modern radiant-tube-heated batch-type annealing furnace, installed in 1943. Power-driven transfer car quickly loads and unloads 20-ton charge

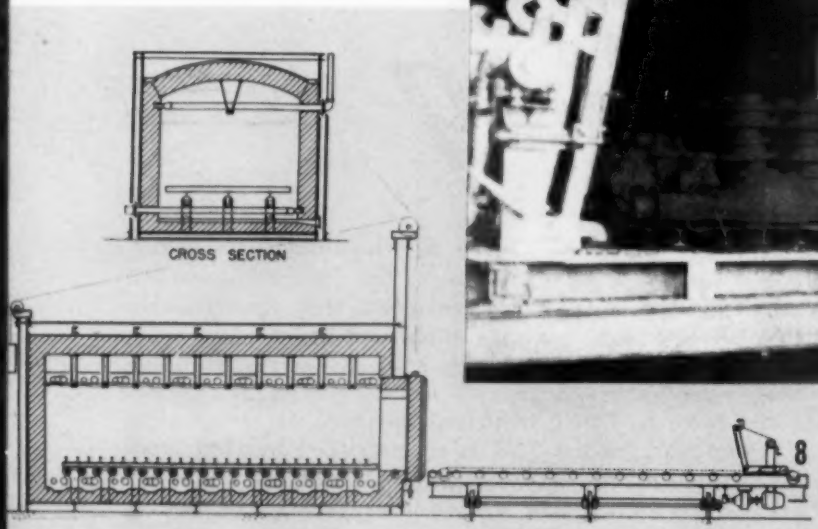
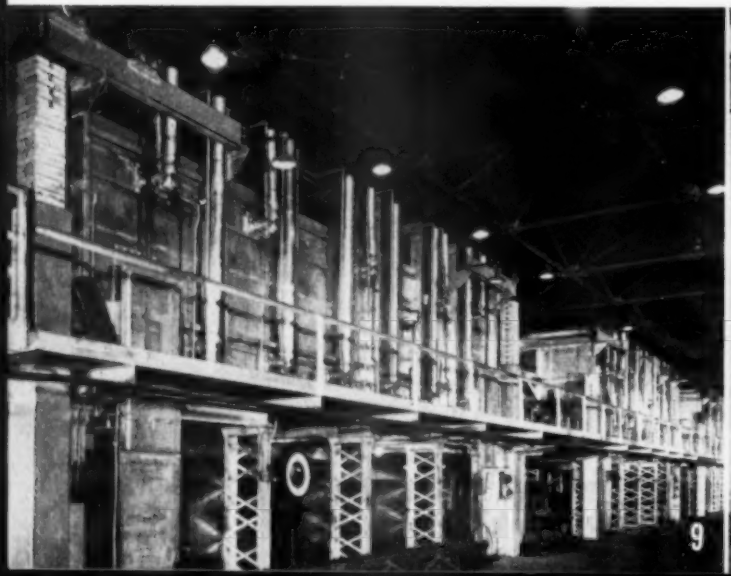
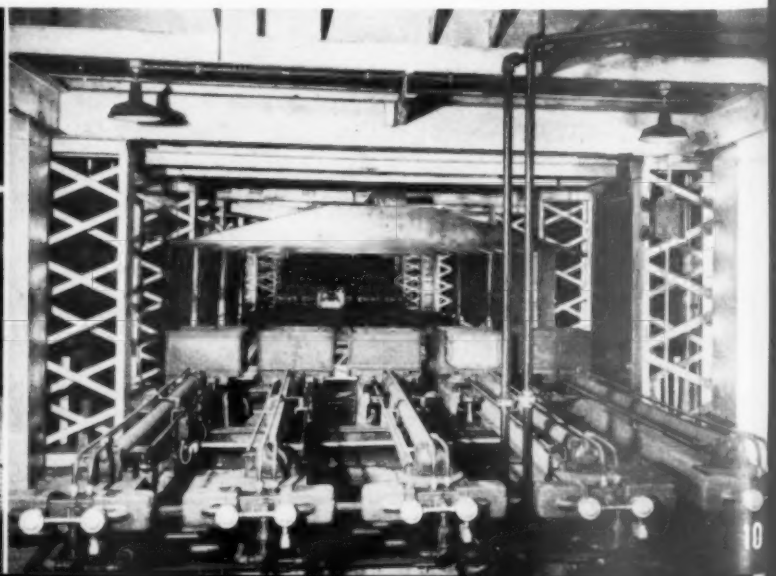


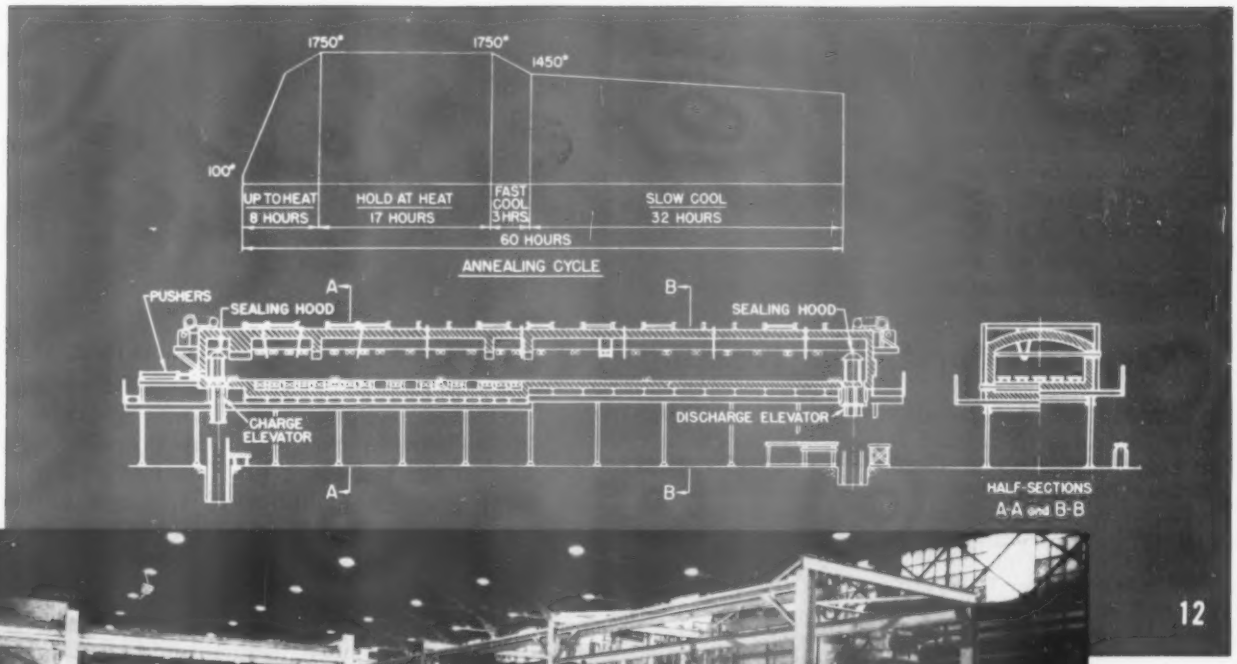
Fig. 8 — Sectional drawing of batch-type furnace shown in Fig. 7

Direct-fired Annealing—The older type of malleable annealers is exemplified by the "King Tut tomb" ovens shown in Fig. 6. These are periodic or batch-type units, built of heavy fire brick, and are direct-fired with gas, coal or oil. For protection against scaling, the castings must be packed in cast iron containers; and in many cases it is necessary to separate and support the castings with a packing material such as sand or iron oxide, which is largely of an insulating nature. Several stacks of these containers are placed in the oven; then the door is sealed with fire clay and the annealing process begun.

With annealers of this type it is necessary to heat about 2 pounds of container and packing material for every pound of work annealed; it is also necessary to heat and cool the oven itself for each batch of castings. Consequently, fuel economy is relatively poor, heating and cooling rates are slow, and the complete annealing cycle requires from seven to ten days. It is interesting to note, however, that the ovens shown in Fig. 6—installed in 1916 by Holcroft & Co. at Michigan (*Please turn to page* 209)







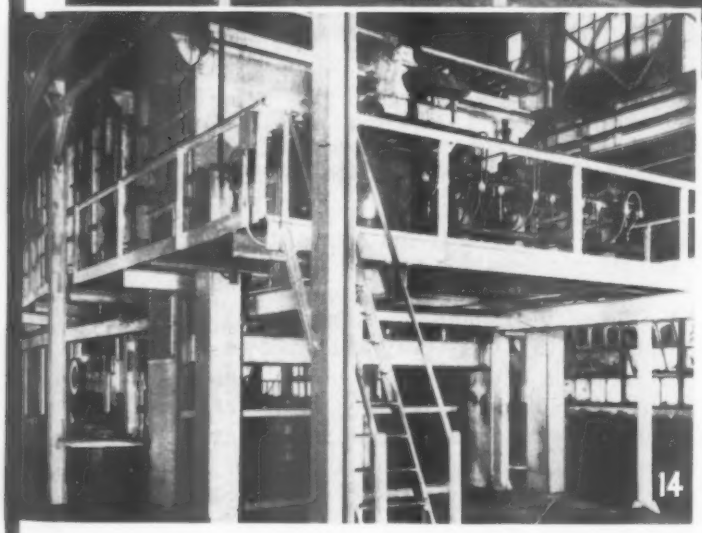


Fig. 12—Sectional view of overhead continuous furnace shown in Figs. 13 and 14

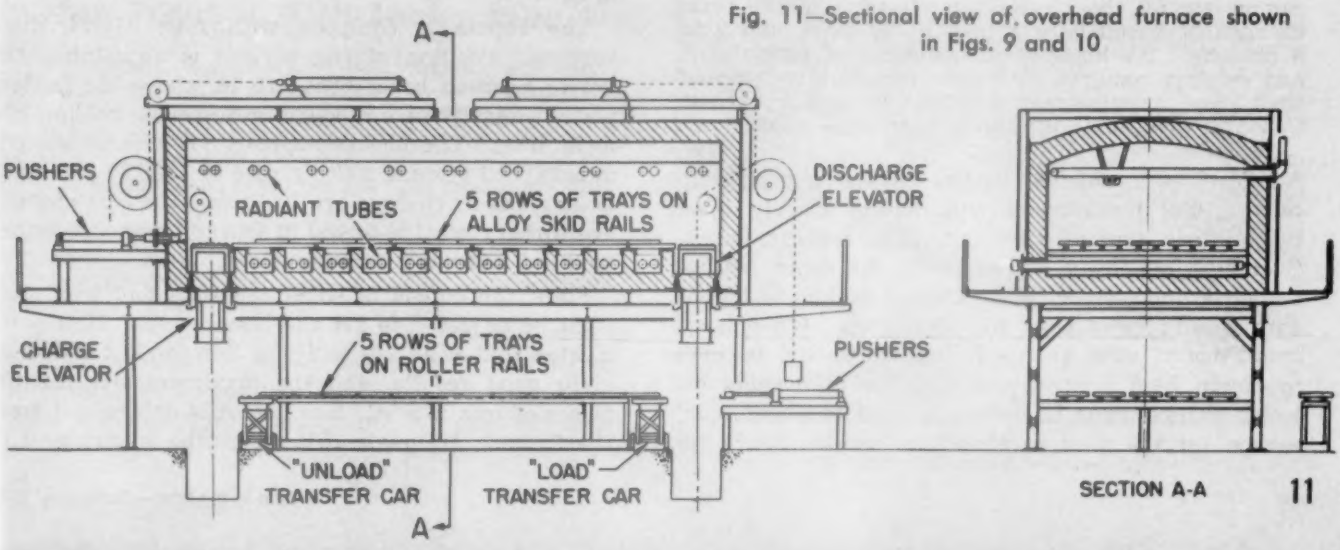
Fig. 13—General view of three overhead continuous annealing furnaces

Fig. 14—View from charge end of one of the furnaces shown in Fig. 13

Fig. 9—Three overhead semicontinuous malleable annealing furnaces. Elevators and hydraulic pushers provide fast loading and unloading

Fig. 10—View from beneath discharge end of overhead semicontinuous furnace

Fig. 11—Sectional view of overhead furnace shown in Figs. 9 and 10



Questions AND

Keep Core Sand From Freezing

Q.—We do not have enough room to store our sharp sand for cores in a heated shed. We are compelled to keep most of it outdoors. Up in this country the winters are severe and the sand freezes into a hard solid mass. We have considered the idea of mixing salt with the sand to prevent it from freezing, but up to the present have not tried the experiment. Somewhere, some time in our miscellaneous reading, we saw a reference to this subject. It was claimed that the addition of salt to sand rendered it unfit for foundry use. We shall appreciate an opinion on this point.

A.—Instances of castings rusting before they are taken out of the sand, and afterward before they are machined or enameled, have been traced to the use of sea water for wetting down the sand. We are not familiar with any instance where salt deliberately has been mixed with the sand, but we are inclined to the opinion it will cause trouble.

If your power plant is an engine and boiler, you might place a steam coil in the sand pile. In another method a wood or coal burning stove might be set up in the center of the sand pile. The stove might be completely enclosed with sand if a small tunnel were provided to deliver air under the grate, and another small opening on top through which fuel could be inserted. In a third method a sufficient quantity of sand for one or two days' operation is dug or blasted away from the frozen pile and spread on the floor of the core oven either by day or night. It is no joke trying to run a shop during a severe winter.

Melting High Steel Charges

Q.—For quite some time we have been using up to 25 per cent steel scrap additions in our cupola, but we wonder how much steel scrap we could use. We can obtain all the steel scrap we want in the form of ends of round bars 1 to 4 in. in diam, and 2 to 6 in. long. We know about additions of ferroalloys, and sulphur removal with soda ash, but understand that some arrangement must be made for carbon. Can you give some information on that phase?

A.—Steel scrap melted in the cupola will pick up carbon, and the amount will depend largely upon temperature, type of coke, and silicon content. Usually a high steel mix will show at the spout a total carbon around 3 per cent. Carbon pickup is higher with soft types of coke and high beds. When large quantities of steel are used, the bed should be high to obtain high temperature, and the coke splits between charges must be increased to provide additional carbon for the steel to absorb. Common figure for addition is 3 lb coke for each 100 lb steel.

Carbon pickup may be increased through use of petroleum or pitch coke with regular coke in the splits between charges; lump graphite in the splits and in the bed coke; graphite electrode stubs in the bed; graphite additions to the iron at the spout; keeping the silicon in the charges low. In the latter silicon is added in the ladle to bring it to the desired point in the iron.

As far as carbon content is concerned, it appears that you will have to determine whether or not an iron with a low total carbon content will be satisfactory for the line of castings you are producing. If not, then you will have to resort to any of the various procedures mentioned to bring the carbon to the necessary level.

Small Cupola Design Features

Q.—In one issue of THE FOUNDRY several years ago we remembered seeing an article describing an efficient operating 12-in. iron melting furnace. We would like to construct one similar to that in our garage though it need not be as small. Height of the garage is 14 ft. and we imagine a 14 or 16-in. diam unit could be used. Can you supply information on the height of the cupola, size of the blower, and other details?

A.—Some years ago, in August 1941 to be exact, Fulton Holtby, University of Minnesota, described the construction details of a 15-in. ID cupola which was being employed successfully as an adjunct to the foundry course in the engineering college of that university. It was made from two 24-in. diam, 3/16-in. shell hot water tanks which were about 54 in. high. In your case, additional sections would have to be used to extend the top 6 to 8 ft above the highest point of the roof.

The cupola is equipped with four 3½-in. diam tuyeres. Position of the tuyeres is adjustable, the lowest position being about 15 in. above the bottom plate, which gives a crucible or reservoir holding 200 lb of iron. The blower supplies 350 cfm of air per minute, and gives a melting rate of 1800 lb per hour. Coke splits or charges are 15 lb, and the iron charges are varied from 120 to 150 lb depending upon whether an 8 to 1 or 10 to 1 ratio is desired.

Since the cupola is small the coke and iron sizes must be adjusted to get the best results. Holtby indicates that coke 2½ x 2½ x 3-in. or 3 x 3 x 3-in. gives good results, and the maximum size for the pieces of iron is 5 in. Bed height is determined from the formula H equals 10½ times the square root of

ANSWERS

the pressure in oz per sq in. plus 6. In other words, if the pressure is 9 oz the bed height should be 37½ in. above the tops of the tuyeres. According to Holtby, the bed after ignition should be allowed to soak not less than 3½ and not more than 4 hr to get good hot iron at the start. Three lb of limestone on top of coke splits and bed is used as a flux.

Wood Is Not Suitable as Fuel

Q.—During the coal strike our supply of coke became low. We have plenty of maple, oak and hickory blocks which have been kiln dried, and we would like to know if they would burn in the cupola to supply sufficient heat to melt the iron. Would the smoke contain elements which would be detrimental?

A.—So far as we know, wood cannot be used as a fuel to melt iron in the cupola. Wood contains only about 11 per cent fixed carbon, the remainder consisting of volatile matter and moisture. While available data indicate that dry wood can supply 8460 Btu per lb, or about 67 per cent of that supplied by coke, its high rate of reactivity with oxygen (burning) gives off the heat much more rapidly than the iron could absorb it. The same thing applies to high reactivity types of coke which give lower temperatures in the cupola.

If the wood could be converted to charcoal, the latter could be used in a pinch to melt iron, but the little information available on use of charcoal indicates that 2½ to 3 times as much charcoal as coke would have to be used—which would make an extremely expensive proposition. If hard or anthracite coal is available, you could mix that up with coke, up to say 35 or 40 per cent in the splits, but not in the bed, and thus conserve the coke.

Has Trouble With Leaky Pipe

Q.—We operate a foundry in Belgium, and are starting the production of small water pipe 2 ft 6 in. long, 1½-in. bore and 5/16-in. wall with a flange on one end. Molds are green sand, and the core is made from sea sand bonded with a special core oil. Charge for the pipe is composed of 50 per cent pig iron containing 2.6 per cent Si, 0.75 per cent Mn, 0.55 per cent P, and 3.65 per cent TC; 20 per cent cast iron scrap; 20 per cent risers, and 10 per cent steel rails. We are having a great deal of trouble due to leakers under a pressure test of 315 psi.

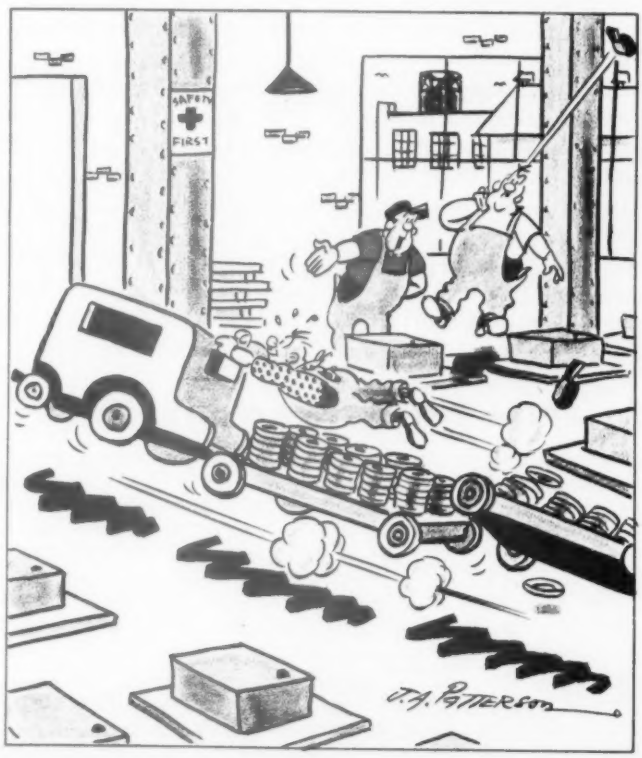
A.—Since any one or a combination of a number of factors may be responsible for the trouble with leakage in the water pipes mentioned, we can only suggest that each be studied and the proper corrections made. First, the trouble might be due to the molding sand condition in that it is too moist or lacks permeability; neither of which is sufficient to cause blows, but does prevent the metal from lying quietly in the mold and results in porous areas. The same might be attributed to the core which does not permit the rapid escape of gases. Be sure that the core contains a good-sized vent, and that the vent is carried to the outside of the flask.

The leakage may be due to improper gating. We assume you are placing two pipes in a flask with the flanges at opposite ends to conserve space, and using a runner between the two with several branch gates leading to the casting cavities. With the down sprue at one end good feeding may not result, and dirt may wash into the cavity. The same may apply to a down sprue at the center of the runner. With thin sections it is necessary to get the metal into the cavity as quickly as possible, and it may be advisable to use three down sprues. Place one in the center, and the others about 7 or 8 in. on either side. Pouring is accomplished with an elongated ladle with three lips or spouts at the proper distances. With the pipe flanges at opposite ends, the runner can be extended so as to feed hot metal into them. Branch gates from the runner may be located directly under the down sprues or equidistant between them.

In regard to cupola charge composition, our calculations indicate that the resulting iron contains about 2 per cent Si, which seems somewhat low for the thickness of section involved. We believe the silicon content should be increased to at least 2.25 per cent. You could eliminate the use of a dry sand core in the pipe by following the practice used in this country

GANGWAY!

By J. A. PATTERSON



"I understand he made it into a hot rod."

for soil pipe. This involves coating perforated steel tube or pipe arbors with a thin layer of green sand. They are used without drying. The arbor is rotated and the sand allowed to drop from a hopper with a long slot gate located about 2 or 3 feet above the arbor. A straight edge parallel to the rotating arbor strikes off the sand to the proper thickness.

Use Old Casting as Pattern

Q.—In our foundry we frequently are called upon to make new stove bowls from old castings. Do you know of any material with which we could paint these old castings, and then sand paper the surface so that they readily may be removed from the sand?

A.—Practically every jobbing foundry at one time or another has this problem dumped in its lap. Considering the time and labor expended on the job of wrestling with one of the old cracked and warped derelicts, we often wonder if the foundryman would not be better off ordering a new casting from the original maker, and passing it on to the customer at a slight advance in price. Of course, in some instances this cannot be done, because the original makers no longer are in existence. Some of these old stove parts last for an almost incredible period, a gratifying testimonial to the qualities of cast iron. In other instances the time and distance factors affect the customer's decision.

So far as our experience goes, no person has developed a standard method for casting these pots. He may sandpaper the inside and outside surfaces and then apply a coating of shellac. As an improvement, where conditions are favorable, he may apply a paper coating to the wet shellac and then shellac the paper on the outside. In a second method he may apply a thin coating of metal cement, a material in use for many years for repairing minor defects on casting faces. In the event the old casting is warped, cracked, or has gaping and empty areas here and there, the best procedure is to make as good a mold as possible and fill it with lead. The lead casting readily may be hammered and finished to the proper shape. It is then used as a pattern to make the iron casting.

Pipe Fittings on Matchplate

Q.—Some time ago in THE FOUNDRY we saw a reference to an improved method of making cast soil pipe fittings from a matchplate which served as pattern and corebox. At the time we were not particularly interested in the subject and therefore did not study the details. In a new position we need the information and have no back file on THE FOUNDRY. Your kindness in supplying the information will be greatly appreciated.

A.—The article to which you refer, "Matchplates Provide Both Core and Mold," by Thomas Boyd, was presented in the December, 1946, issue of THE FOUNDRY. Following is a slightly abridged copy:

The writer has developed a method for increasing production of the castings known as soil pipe fittings. Experience over the past year indicates that production increased 20 to 30 per cent by using the squeezing machine and foundry labor of average intelligence but without former skill or experience. The method is based on the employment of two matchplates constituting a corebox, pattern and matchplate all in one piece. Each plate has one half a shell pattern on one side, and half corebox on the other side.

In practice, a cast iron arbor with an offset arm is placed in what is to be the drag half of the corebox. Both coreboxes are filled with sand, squeezed and booked to form a complete core. While the plates are still together, the cope flask is placed in position, filled with sand and squeezed. The assembly is inverted and the drag is filled with sand, squeezed and lifted off. The drag matchplate is removed. The drag is replaced and the assembly is rolled over to bring the cope to proper position on top. The cope is lifted off. The top plate is removed and the cope is replaced. The mold then is in condition to receive the metal. It will be noted that the green sand core rests securely in the prints and is not moved or disturbed at any time during the process of making and assembling the mold.

Composition for Melting Pots

Q.—Can you give us any information on the best composition for cast iron pots or crucibles for melting aluminum alloys? Do you think that 25 to 30 per cent chrome iron is technically and economically applicable for such use?

A.—The question of what is the most suitable composition for aluminum alloy and other melting pots is one on which considerable diversity of opinion exists, and as a consequence a number of compositions are being used successfully. Essentially, the answer to the question is one of economics wherein the life of the pot is balanced against its cost, or, expressed in another way, the number of pounds of metal melted per dollar of pot cost. Since conditions of usage and care vary considerably in different foundries, such data can only be obtained and applied in the individual foundry.

Compositions for pots range from the plain or unalloyed gray irons to those containing various amounts of chromium, nickel, molybdenum, etc. One feature that applies to all compositions is that care in cleaning the interior of the pot after the day's use, and applying a suitable refractory wash before the succeeding run, is as important as seeing that hot spots do not develop on the exterior due to improper direction of burner flame.

In the plain or unalloyed irons, the high total carbon type will possess better resistance to the alternate heating and cooling that the pot undergoes in use, and a suitable composition may contain 1.5 per cent Si, 0.50 per cent Mn, less than 0.30 per cent P and not under 3.50 per cent TC. Total carbon content may be increased in cupola melting by using low-silicon, high-carbon raw materials, and making ladle additions of silicon to bring that element to the de-

(*Concluded on page* 88)

The 1950 Model ROYER Sand Conditioner *offers*

- MAGNETIC REMOVAL OF TRAMP IRON
- DISCHARGE IN ANY DESIRED DIRECTION
- SELF-LOADING
- SELF-PROPULSION
- AUTOMATIC . . . *Trash Rejection, Blending, Combing, De-gassing, Aerating*
- UP TO 50 TONS PER HOUR OF HIGHEST GRADE MOLDING SAND

The ROYER SAND CONDITIONER

Shoveling foundry sand by hand is certainly the *hard way* — the wastefully slow way! Every hour spent with a shovel adds to cost . . . and makes it just that much more difficult to compete with fully mechanized foundries using Royer Self-Propelled, Self-Loading Sand conditioners. Why not get information on what the new Royer machine can do? Our engineers will be glad to furnish data that will enable you to make a clear cut comparison with your present equipment. Write Royer today.

THE HARD WAY

ROYER

FOREMOST IN SAND CONDITIONING EQUIPMENT

ROYER FOUNDRY & MACHINE CO.

159 PRINGLE ST., KINGSTON, PA.

Questions AND ANSWERS

(*Concluded from page* 86)

sired point. Alloy cast irons which have been used satisfactorily include compositions in the following ranges: 1.80 per cent Si, 0.70 per cent Mn, 0.15 per cent P, 3.25 per cent TC, 0.50 per cent Cr, and 0.50 per cent Mo; 1.00 per cent Si, 0.65 per cent Mn, under 0.30 per cent P, 3.30 per cent TC, 0.75 per cent Cr, and 2.00 per cent Ni.

With reference to pots made with 25 to 30 per cent chrome iron, there is no doubt about the ability of that material to withstand the temperatures involved, but since the cost of that material is considerably greater than the low-alloy cast iron pots previously mentioned, it is doubtful that the increased life will be sufficient to make their use a paying proposition. However, the only way to determine the answer will be to operate one under the conditions prevailing in your foundry, and keep careful records for comparison with similar records obtained on other types of pots.

Want Low Melting Point Alloy

Q.—We are interested in obtaining information on the composition of an alloy with a melting point between 135 and 145° C. We understand that such an alloy has been used in the U. S. A.

A.—While we do not know of any specific alloy with the given range of melting point, it is possible that one of the following eutectic compositions might fill your needs. For example the bismuth-lead eutectic containing 56.5 per cent Bi and 43.5 per cent Pb has fusion point of 125° C. The bismuth-tin eutectic containing 58 per cent Bi and 42 per cent Sn fuses at 137° C. The bismuth-cadmium eutectic containing 61.5 per cent Bi and 38.5 per cent Cd has a fusion point of 144° C while the tin-lead-cadmium eutectic has a fusion point of 145° C and contains 50 per cent Sn, 32 per cent Pb and 18 per cent Cd.

Men Required To Charge Cupola

Q.—Is there a definite relationship between the number of men required and the weight of material charged into the cupola?

A.—Briefly, the answer is no. By way of elaborating this rather abrupt statement the following extreme example is submitted for your consideration. In a prominent gray iron foundry the average daily heat is 200 tons. At one time the charges were loaded in the yard, pushed on buggies to an elevator, pushed around to any desired point on the charging floor, and then the materials were thrown into the cupola by hand. Number of men required varied from 14 in winter to 18 in summer.

Later a new cupola was erected. It was not provided with any charging doors, but was designed to be charged through the top in the same or almost in the same manner as a blast furnace. Coke and iron were lifted in buckets by an electric traveling crane. Each bucket came to rest on the top rim of the furnace. The drop bottom opened and allowed the contents to slide down into place. One man forked the coke into the bucket. The crane man manipulated a magnet to load the buckets with pig iron and scrap. The buckets were located strategically near the stock pile in the yard. One craneman, one coke forker and one man releasing and hooking the magnet replaced the former 14 or 18 men.

One might be justified in stating that whereas formerly 200 tons were handled daily by 18 men, an average of 11 tons each, now the same tonnage is handled by 3 men, an average of nearly 67 tons each. To put the matter in another light the wages of 11 to 15 men are saved every day. However, the point must not be overlooked that the crane and other equipment represent a considerable outlay in installation, maintenance, and repair. These factors must be taken into account in any comparison that pretends to even approximate accuracy.

Green Sand Cores Can Be Blown

Q.—Do you think it is practical to blow green sand cores for a bushing 6 in. ID, 8 in. OD and 12 in. long? At present we use dry sand cores in these castings molded horizontally, two in a flask.

A.—An interesting description of blowing green sand cores for bushings, somewhat smaller than those to which you refer, appeared in THE FOUNDRY March, 1942. The castings are molded two in a flask and each core is reinforced with a 1-in. diam cast iron arbor extending approximately an inch beyond the core print at each end of the core. The arbor is fluted on the cope side to hold a ¼-in. rod. Arbor and rod are placed in the corebox before it is shoved under the blowing machine. After the half corebox and drag are rolled over the rod is removed to form a vent opening through the center of the core. Arbors remain in the molds as far as the shakeout station where they are removed from the castings, loaded in small boxes and returned to the vicinity of the core blowing machine.

In the beginning, the metal half corebox is placed on a roller conveyor and shoved under the magazine of the blowing machine where suitable stops and guides locate it accurately under the second half of the corebox attached permanently to the base of the magazine. The lower half is lifted mechanically and held in close contact with the upper half. The air control valve is opened and sand from the magazine is driven into the two corebox cavities through two openings, each 1 in. diam. Compressed air pressure is maintained at 100 psi.

The lower half corebox containing the two complete cores is lowered back to place and shoved along the conveyor to a point a few feet distant where the drag, face down, is placed on the corebox. The assembly is shoved into a rollover device where it is inverted and lowered onto a continuation of the conveyor. The half corebox is removed and returned to the blowing machine. The drag is covered by the cope to complete the cycle.

Suppose your foundry employed less than 100 . . .

Cleaning department floors quickly become cluttered unless ferrous scrap—such as gates, runners and sprues—is cleared away promptly. If your foundry employed less than 100 workers how would you perform this job? Manually—or magnetically?

The answer is obvious when you consider the high cost of hand labor today. An Ohio Magnet completes *in minutes* all the work several men do in hours. Man-hour savings pay for magnet cost in a relatively short time.

The same Ohio Magnet saves you money in other operations. Use it to move bulky castings *instantly* without wasting time fastening slings. Load and unload annealing cars three times faster.

To turn man-hours into magnet-minutes, write today to Ohio—*25 years a leader in magnetic materials handling.*

How would you pick up cleaning department scrap?

SELECT YOUR MAGNET from two Ohio types. The PROTECTO-WELD magnet, shown above, is made in 39, 46, 55 and 65-inch diameters. Bolted construction types include these and other smaller sizes. Ohio also builds magnet control equipment.

5 TYPICAL JOBS WHERE OHIO MAGNETS CUT COSTS

- unloading scrap, rails and pig iron.
- loading charging cars, hoppers and buckets.
- loading and unloading annealing cars.
- moving bulky castings in cleaning dept.
- picking up sprues, gates, runners, overflow.

THE OHIO ELECTRIC MFG. CO. • 5900 MAURICE AVENUE • CLEVELAND 4, OHIO

Ohio MAGNETS

A-2041

OF INDUSTRY

HARRY S. THOMPSON has been appointed general works manager of American Furnace & Foundry Co., and American Boiler & Foundry Co., Milan, Mich., subsidiaries of Maumee Malleable Castings Co., Toledo, O., where he will supervise production of gray iron castings and the company's line of domestic heating equipment. Mr. Thompson until recently was associated with George H. Elliott & Co., New York, foundry management engineers. Prior to that, for 7 years he supervised a number of foundry expansion programs for Norris & Elliott, Columbus, O., foundry management consultants.

♦ ♦ ♦

Dr. Walter Dean has been named chief metallurgist at the Cleveland Works of Aluminum Co. of America, succeeding **E. V. Blackmun,** who has been appointed chief metallurgist, Die Casting Division, Garwood, N. J. Dr. Dean, who was graduated from Cooper Union Institute of Technology, received his doctorate at Rensselaer Polytechnic Institute. For the last 5 years he has been assistant manager of the Permanent Mold Plant, Cleveland. Twenty years ago he joined the Research Division in the experimental mill, New Kensington, Pa. going to the Cleveland laboratory in 1931. Mr. Blackmun, who was graduated from Tufts College, took postgraduate studies at Harvard University and Case Institute of Technology. He has been associated with the company for 15 years, contributing to development of finishing processes, and established the Cleveland Finishing Laboratory, largest company unit of its type. From 1941, until he became chief works metallurgist in 1945, he served as head of the laboratory, and as co-ordinator of metallurgical work on permanent mold castings.

♦ ♦ ♦

Paul M. Arnall, for the past several years, executive vice president and director, Ohio Injector Co., Wadsworth, O., has been appointed vice president-general manager of the Lunkenheimer Co., Cincinnati. Mr. Arnall, a native of Elk Falls, Kans., attended University of Kansas. Prior to his connection with Ohio Injector Co. he was general sales manager, Graton & Knight Co., Worcester, Mass. Other officers of the company include: **Frank P. Rhame,** president; **Homer E. Lunken,** vice president-assistant general manager; **Harry A. Burdorf,** vice president-sales; **Edmund P. Lunken,** vice president; **Chester C. Isekeit,** treasurer; and **Charles W. Burrage,** secretary.

♦ ♦ ♦

Ben F. Sweet has become associated with the Morse Chain Co. Inc., Ithaca, N. Y. as foundry superintendent. Previously Mr. Sweet had been foundry superintendent for 2½ years at Noble & Wood Machine Co. Inc., Hoosick Falls, N. Y., and 19 years with Sweets Foundry Inc., Johnson City, N. Y., 4 years of which he was superintendent.

♦ ♦ ♦

A. A. Silverman, formerly vice president, has been elected president-general manager, Vilter Mfg. Co., Milwaukee, succeeding **E. B. Tilton** who has held the positions of president, general manager and treasurer and remains as management consultant. **B. J. Fridl** has been elected vice president in charge of manufacturing and **M. F. Grady,** comptroller, has been named treasurer.

♦ ♦ ♦

Prof. Fr. Pisek, president of the Czechoslovak Technical Foundry Association since its organization 26 years ago, has been named president of the International Committee of Foundry Technical Associations for 1950. **Dr. Bedrich Zimmermann** of Prague succeeds Prof. Pisek as president of the Czech association.

♦ ♦ ♦

W. M. Buckholtz, until recently associated with Auburn Foundry Inc., Auburn, Ind., has been appointed foundry superintendent, Lynch Corp., Anderson, Ind., succeeding the late C. F. Armstrong.

♦ ♦ ♦

Leonard C. Price has been appointed head of the department of mechanical engineering, Michigan State College. Prof. Price who received his master of science degree from Cornell University, served as instructor there, and as research associate and associate professor at

(*Continued on page* 92)

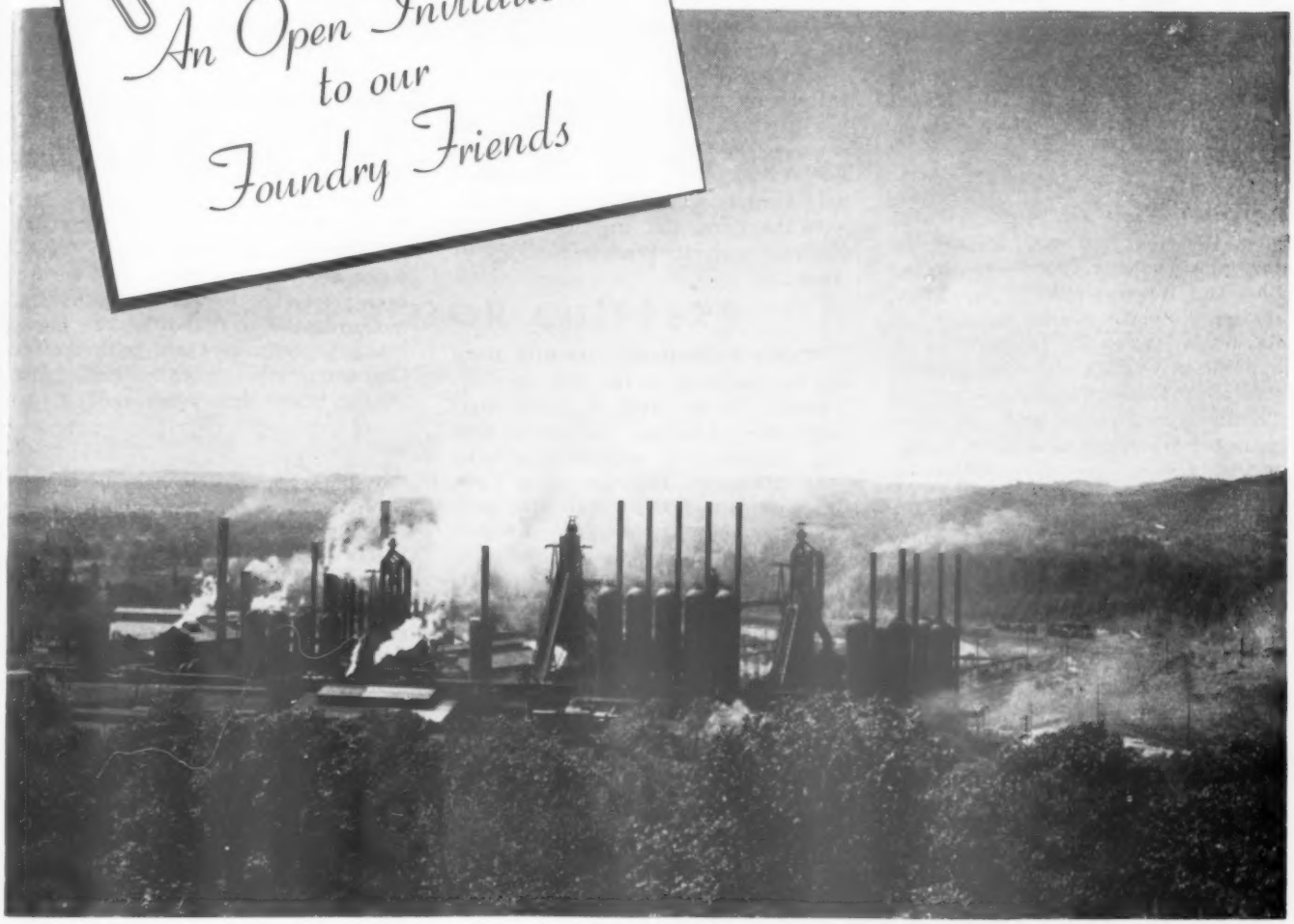
HARRY S. THOMPSON

E. V. BLACKMUN

DR. WALTER DEAN

PAUL M. ARNALL

An Open Invitation to our Foundry Friends



Woodward Iron Company extends a cordial invitation to its good friends in the foundry trade to visit its plants and properties.

Here at Woodward you will see an integrated iron producing property, embracing 70,000 acres, that is unique in America. On Woodward's property are two large coal and three iron ore mines with adequate reserves of coal and ore for the balance of this century . . . three blast furnaces . . . a modern By-Product plant . . . 667 employees' homes, stores and other buildings. All operations are served by Woodward's transportation system, comprising 447 railroad cars and 9 steam locomotives, with 51.34 miles of railroad trackage.

After viewing this layout, you will understand why Woodward is and will continue to be a dependable source of uniform pig iron supply for many long years to come.

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

Independent Since 1882

GENERAL SALES OFFICES: 1515 First National Building • Birmingham, Alabama • Phone 4-6786

Men OF INDUSTRY

(*Continued from page* 90)

University of Arkansas. He joined the staff of Michigan State College in 1942.

♦ ♦ ♦

Harry C. Platt has been appointed vice president of the Engineered Castings Division, American Brake Shoe Co., Rochester, N. Y. Mr. Platt, formerly division works manager at Rochester, joined the company as an apprentice in 1942, following graduation from Massachusetts Institute of Technology. Prior to becoming work manager he served as division metallurgist.

♦ ♦ ♦

Wayne H. Gunzelman, who recently joined Mohawk Foundries Inc., Cleveland, has been named to set up a brass and bronze permanent mold division to augment its present facilities of aluminum in sand and permanent mold. Mr. Gunzelman will also supervise building and organization of a metallurgical laboratory for the company. In 1940 he became director of the metallurgical department, National Bronze & Aluminum Foundry Co., Cleveland, and 5 years later was named director of research and foundry engineering, Samuel Greenfield Co. Inc., Buffalo. For the past year he has been general manager of the Nonferrous Division, Buffalo Pipe & Foundry Corp., Buffalo.

♦ ♦ ♦

Milton L. Huemme has been appointed manager of coke sales, Diamond Alkali Co., Cleveland, succeeding the late Benjamin F. Lambert. Mr. Huemme studied at Douglas Business College, McKeesport, Pa., supplemented later with business courses at Carnegie Institute of Technology. In 1936 he joined Diamond Alkali's coke sales office in Cleveland, as a sales and service representative, following 9 years in raw materials supply work at the company's Pittsburgh offices. In 1945, following 2 years in military service, he rejoined the Cleveland coke sales office. From 1923 to 1927 Mr. Huemme held various administrative positions with the Texas Co., the Pennsylvania Railroad, and the Equipment Corp. of America.

♦ ♦ ♦

Walter L. Deutsch, currently serving as chairman of the Central Ohio Chapter of the AFS, is sales engineer, the Columbus Malleable Iron Co., Columbus, O., subsidiary of Lake City Malleable Co., Cleveland. Mr. Deutsch joined Ohio Malleable Iron Co., Columbus, O., in 1914, as a patternmaker, later working in the laboratory. He was associated with Detwiler Mfg. Co. from 1920-1922, when he became superintendent, Ashland Malleable Iron Co. Ashland, O. The following year he joined Dalton Foundries Inc., Warsaw, Ind., as superintendent, and in 1924 was appointed patternmaking foreman and sales engineer, Columbus Malleable Iron Co. Mr. Deutsch was one of the organizers of the Central Ohio Chapter and has served as treasurer, director, and vice chairman.

♦ ♦ ♦

Robert D. Hill has been named treasurer, Taylor-Wharton Iron & Steel Co., High Bridge, N. J. Mr. Hill, a graduate of University of Pittsburgh, was associated previously with Noma Electric Corp., New York, Union Switch & Signal Co., Swissvale, Pa., and served as a special agent with Federal Bureau of Investigation. **J. G. Kreis,** for the past 35 years with Weir Kilby Corp., New York, has been appointed vice president in charge of purchases at Taylor-Wharton, retaining his position as purchasing agent of Weir Kilby Corp.

♦ ♦ ♦

Jean Laine, present director of the Ecole Superieure de Fonderie, the French specialized school for foundry engineers, has been awarded the order of the Legion of Honor. Mr. Laine for several years was technical secretary of the Association Technique de Fonderie, Paris, and served as reporter for its committee on the modernization of foundries. He made many friendly contacts with American foundrymen when he visited the United States two years ago.

♦ ♦ ♦

William J. Grant has been appointed manager of southern sales, National Bearing Division, American Brake Shoe Co., New York, with headquarters in Richmond, Va. Mr. Grant, a graduate of Georgia Institute of Technology, and formerly sales representative for the company's Brake Shoe & Castings and Southern Wheel Divisions, joined the company in 1940.

♦ ♦ ♦

William C. Bruton, formerly sales engineer, has been appointed district sales manager, American Manganese Steel Division, American Brake Shoe Co., New York. Mr. Bruton, who joined American Brake Shoe Co. in 1916, will cover the Pacific Northwest including the Yukon territory and Alaska, with headquarters at the division's plant in Oakland, Calif. **Robert H. Elem,** formerly welding engineer, has been appointed Pacific Coast manager of the welding products department. Mr. Elem,

(*Continued on page* 94)

HARRY C. PLATT

WAYNE H. GUNZELMAN

MILTON L. HUEMME

WALTER L. DEUTSCH

15 NEW COST-CUTTERS

THE 15-IN-5 ROTOR CHIPPERS

5 "REGULARS"... 5 "SUPER-SPEEDS"... 5 "SUPER-SOCKS"
—ALL FROM 5 BASIC MODELS

Rotor Tool brings you the biggest step forward in chipping hammers in the past 15 years!

You can give Old Man Cost a blow he'll never forget with the sensational new ROTOR Chipping Hammers!

MORE VERSATILE. You can easily adapt each basic model to serve as *3 hammers to match your job:* (1) A "regular" model, (2) A "super-speed" model, (3) A "super-sock" model—because you can switch from one to another by a simple change of parts.

SHORTER *. . . easier to get into crowded quarters* because of new exclusive "dough-nut" valve.

LIGHTER *. . . easier to handle.*

FASTER CUTTING *because of new exclusive design.*

Write for all the facts today!

AIR O'TOOL

(*Continued from page* 92)

a graduate of University of Southern California, will make his headquarters at the division's plant in Los Angeles.

♦ ♦ ♦

Fitz Coghlin Jr., manufacturing control manager, Albion Malleable Iron Co., Albion, Mich., is present chairman of the Central Michigan Chapter of the AFS. A native of Worcester, Mass., Mr. Coghlin attended public schools in Shrewsbury, Mass., was graduated from University

FITZ COGHLIN JR.

of Texas in 1941, and later studied at Worcester Polytechnical Institute. He was metallurgist, Arcade Malleable Iron Co., Worcester, from 1941-1945, when he joined Albion Malleable Iron Co. in similar capacity. Last year he was appointed manager of the Manufacturing Control Division, which includes the metallurgical, industrial engineering, standards and rate, and equipment design engineering departments. Mr. Coghlin has served the Central Michigan Chapter as secretary-treasurer and last year was vice chairman. He is also a member of the technical council, Malleable Founders' Society.

♦ ♦ ♦

Robert N. Lynch, formerly metallurgical sales and service engineer in the Michigan-Ohio territory of Park Chemical Co., Detroit, has been named sales manager of the treating materials division. Mr. Lynch has been associated with the company for the past 10 years.

♦ ♦ ♦

W. R. Caple, since 1939 in charge of magnesium sales in the Chicago branch office of Dow Chemical Co., has been appointed co-ordinator of branch office activities for the magnesium sales department, working out of company's main office in Midland, Mich. Mr. Caple was graduated from Michigan College of Mining and Technology in 1930, and received his master's degree in business administration from University of Chicago last year. He joined Dow Chemical in 1931, as a metallurgist, and in 1935 became a member of the magnesium sales force.

♦ ♦ ♦

W. A. Hawkins has been appointed sales representative, Keokuk Steel Casting Co., Keokuk, Iowa, with headquarters in a new office recently opened at 209 South LaSalle St., Chicago. Mr. Hawkins joined the company upon its reorganization in 1936, as a pattern shop apprentice and assistant metallurgist. Later, as a member of the production staff he had the opportunity to become familiar with various phases of foundry operation. He has been in charge of production since 1946.

♦ ♦ ♦

Walter A. Kesterke has been appointed grinding wheel sales representative in Wisconsin and southwest Michigan for United States Rubber Co., New York, with headquarters at the Milwaukee branch. Mr. Kesterke has had 20 years experience in malleable iron and steel foundries, having been foundry superintendent of the Edgewater plant, Auto Specialties Mfg. Co., and foundry engineer, Benton Harbor Malleable Industries, Benton Harbor, Mich.

♦ ♦ ♦

George R. Lundberg has been appointed director of advertising and sales promotion, the Osborn Mfg. Co., Cleveland. Mr. Lundberg joined the company 17 years ago and has served as personnel manager, sales service manager of the Molding Machine Division, brush sales representative in midwestern Michigan, and for the past 2 years, chief accountant of the company.

♦ ♦ ♦

Alfred C. Dappert has been appointed general sales manager, Mueller Brass Co., Port Huron, Mich. Mr. Dappert spent 10 years as sales manager of the company's Chicago territory, moving to Port Huron this year as sales manager of the fabricated products division. Most recently he has been assistant manager of the industrial sales division.

♦ ♦ ♦

William Grede, president, Grede Foundries Inc., Milwaukee, has been appointed a member of the scholarship committee which Allis-Chalmers Mfg. Co., Milwaukee, has established to assist children of its employes in financing their way through college.

♦ ♦ ♦

Earl W. Pughe has joined the Wheland Co., Chattanooga, Tenn., as manager of the manufacturing division which includes design and production of oil field drilling equipment and sawmill machinery. Mr. Pughe, a graduate of Rensselaer Polytechnic Institute, until recently was assistant to the president, Dana Corp., Toledo,

EARL W. PUGHE

O. For 22 years he was associated with Chevrolet Division, General Motors Corp., and during the war managed Chevrolet plants producing components for piston type and jet airplane engines.

♦ ♦ ♦

Austin Goodyear has been appointed assistant to **B. T. Moffatt,** vice president in charge of sales, Hewitt-Robins Inc., New York. Other appointments within the sales organization include: **C. A. Thompson,** Charleston district sales manager; and **C. W. Brooks,** formerly northeastern Pennsylvania representative, who has been transferred to the Virginia-North Carolina sales territory, handling both Hewitt Rubber Division and Robins Conveyors Division products.

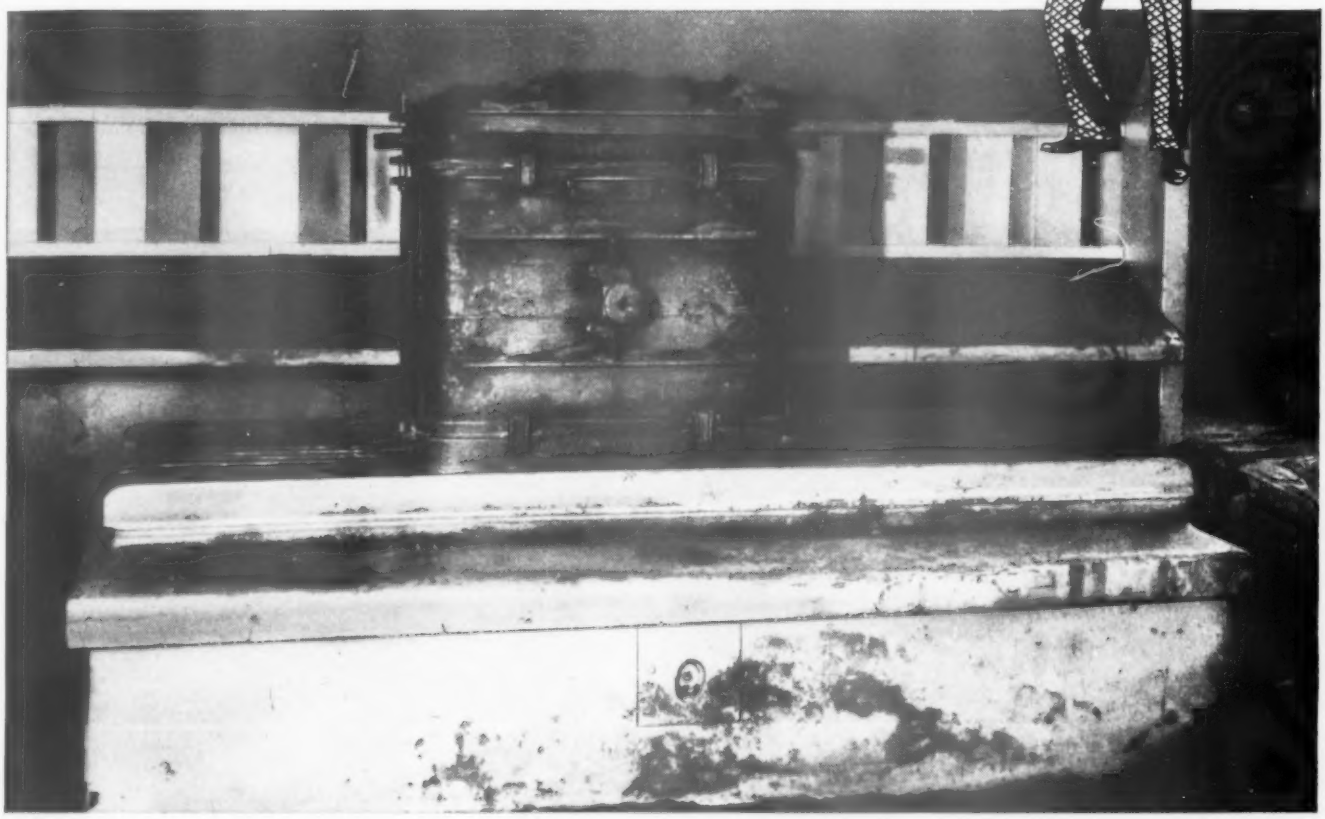
♦ ♦ ♦

J. Robert Bunch has been appointed sales representative to assist **J. D. Alexander** in the Cleveland sales office, American Wheelabrator & Equipment Corp., Mishawaka, Ind. Mr. Bunch, who attended Indiana University, joined the company in 1936. Following 9 years in various production departments, he has spent the last 4 years supervising erection and servicing of blast cleaning equip-

(*Concluded on page* 96)

You can tell the difference

. . . with your eyes shut!



The Robins Floatex Shakeout shakes the flask—not the building

You don't have to look at the name to recognize a Robins Floatex Shakeout when it's running.

The mere fact that you don't feel the building shake tells you at once that it's a Robins. And therein lies the big basic difference between a Robins Floatex and any ordinary shakeout!

No shaking effort is wasted with a Robins Floatex Shakeout. It shakes the flask—not the building! This is because it is the only *full-floating* foundry shakeout. The live frame and load *both* ride on big coil springs.

Naturally, you'd expect this full-floating principle to save wear and maintenance expense. And users' records prove that it does.

A Robins Floatex Shakeout offers you many other important money-saving features, too. For example, you can use it to knock out cores . . . right in the same operation with your flask shakeout!

Why not let a Robins engineer explain how the Robins Floatex Shakeout can make a big difference in *your* foundry output? Write Robins Conveyors Division today.

SEND TODAY for Bulletin 124-B. Gives you a complete picture story of benefits you enjoy with portable, stationary or self-discharging Robins Floatex Shakeout. Write Robins Conveyors Division, 270 Passaic Ave., Passaic, N. J.

ROBINS

FLOATEX SHAKEOUT

ROBINS CONVEYORS DIVISION **HEWITT-ROBINS INCORPORATED**

(*Concluded from page* 94)
ment and dust collectors in the company's Cleveland area.

♦ ♦ ♦

P. M. Offill Jr., until recently California representative, Geo. P. Reintjes Co., Kansas City, Mo., has been transferred to the Pittsburgh territory of the company, manufacturer of sectionally supported refractory walls and arches.

♦ ♦ ♦

F. R. Wilkes has been appointed sales engineer in the Chicago area, and **K. R. Bartholomew,** sales engineer in the eastern Pennsylvania-Northern New Jersey territory for Simonds Abrasive Co., Philadelphia.

Thomas Ashcroft, for 25 years associated with Hunt-Spiller Mfg. Corp., Boston, has been appointed superintendent of the Dorchester Brass & Aluminum Foundry Inc., Hyde Park, Mass.

♦ ♦ ♦

Russell E. McIntyre, formerly associated with Michigan Steel Castings Co., Detroit, has been appointed foundry foreman, Texas Electric Steel Casting Co. Inc., Houston, Tex.

♦ ♦ ♦

William Schramm has been named chief engineer and superintendent of manufacturing for Woodruff & Edwards Inc., Elgin, Ill., ferrous and nonferrous foundry. **Richard Hampel** will assist Mr. Schramm.

♦ ♦ ♦

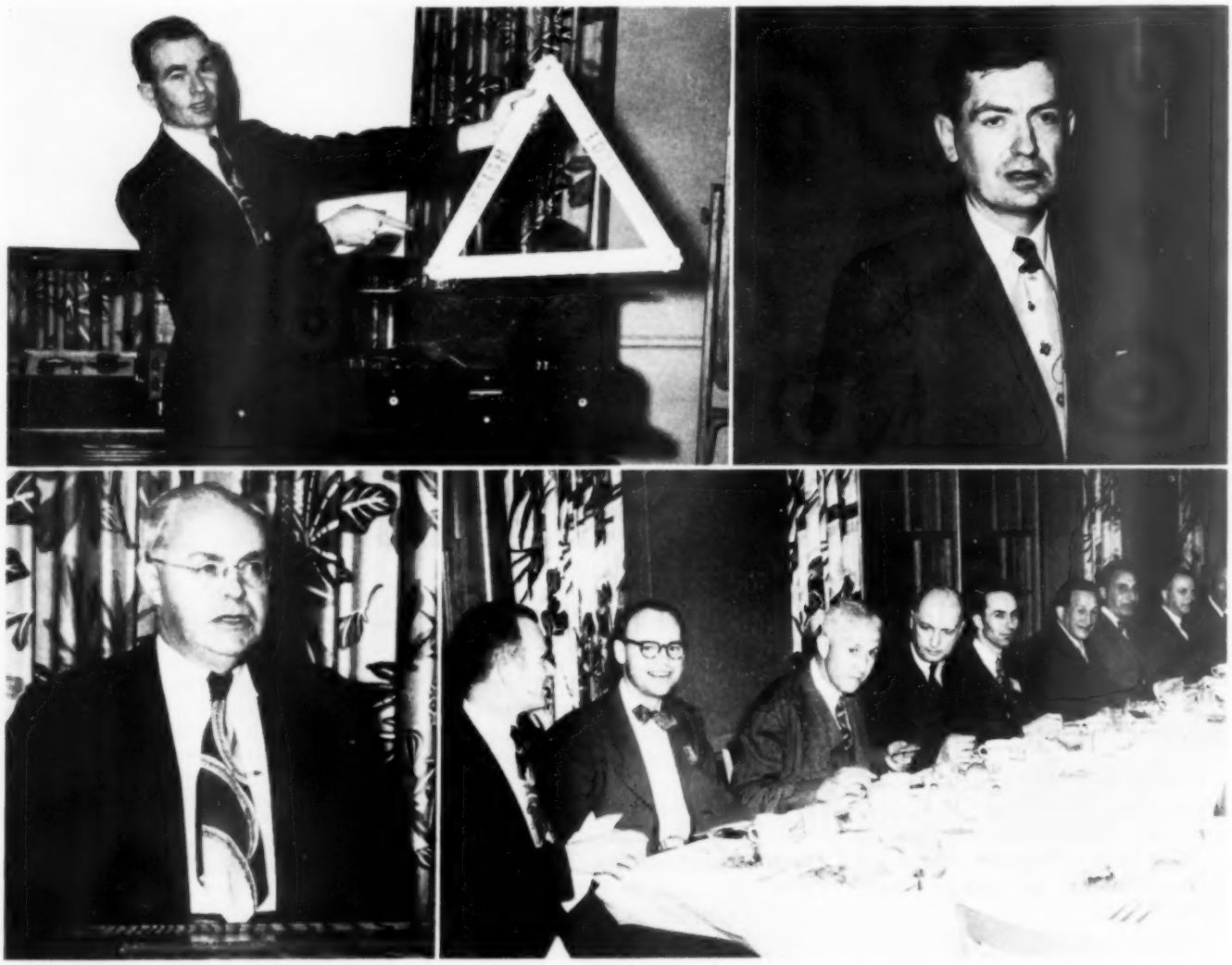
Arthur Kuiper, formerly controller, Continental Foundry & Machine Co., East Chicago, Ind., has been appointed treasurer, succeeding **W. L. Spencer,** who has retired.

♦ ♦ ♦

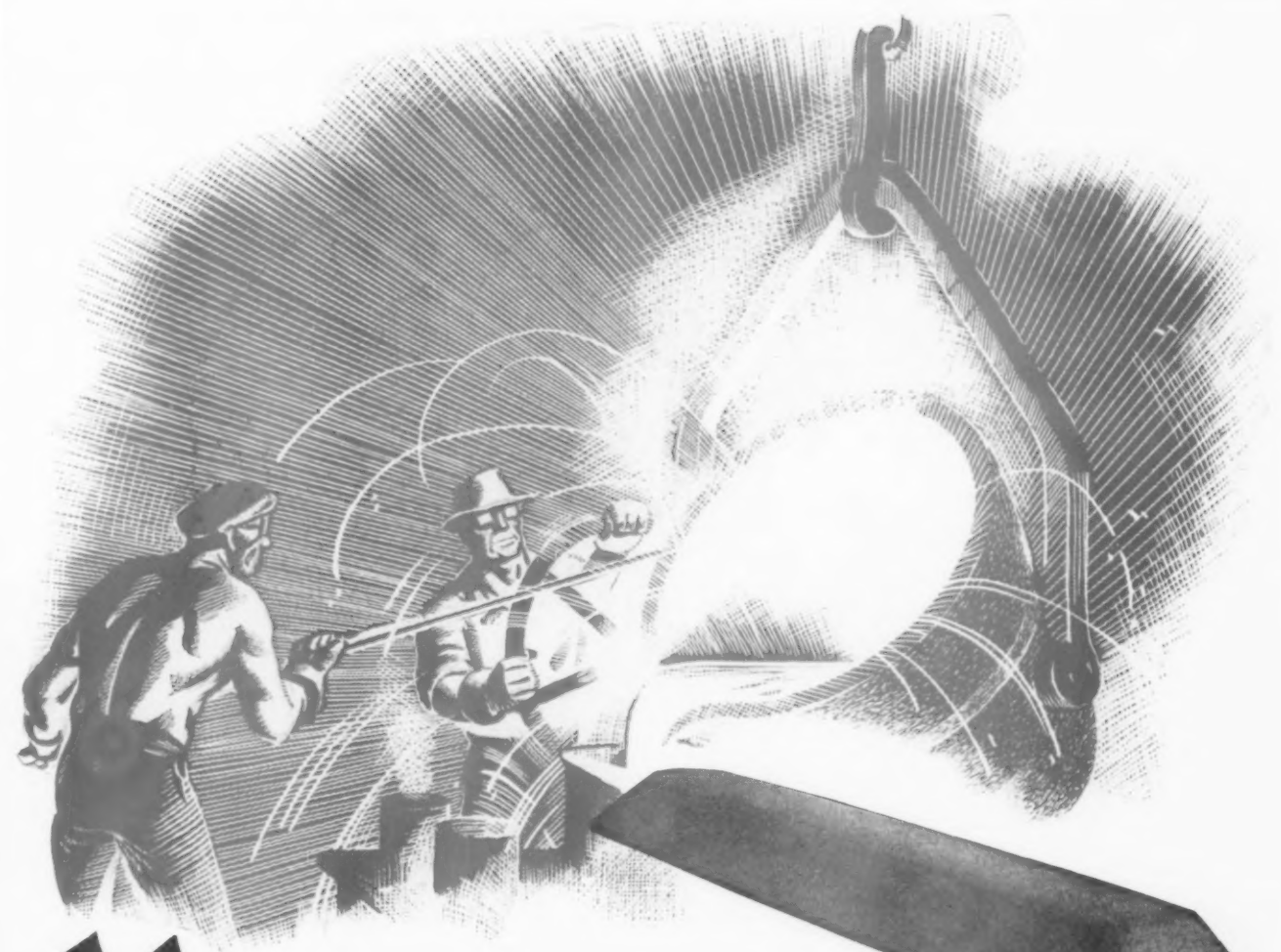
S. A. Press, since 1938 sales manager, the John Lucas Paint Co., New York, has been appointed general sales manager, Swan-Finch Oil Corp., New York.

♦ ♦ ♦

C. W. Tuttle has resigned as purchasing agent, Indiana Foundry Corp., Muncie, Ind.



MICHIGAN FOUNDRY CONFERENCE: Annual Michigan Foundry Conference was held at Michigan State College, East Lansing, Mich., Oct. 28-29. Views of some of the speakers and the dinner are shown above. At upper left is William T. Bean Jr., consultant, Detroit. Dan E. Krause, Gray Iron Research Institute, Columbus, O., is at upper right. At lower left is R. G. McElwee, Vanadium Corp. of America, Detroit. At lower right, left to right, are: Mr. Bean; Herbert Scobie, AFS, Chicago; Frank Tatnall, Baldwin Locomotive Works, Philadelphia; V. A. Crosby, Climax Molybdenum Co., Detroit; Dr. A. J. Smith, Michigan State College; Ted Abrams, Abrams Instrument Co., Lansing, Mich.; C. C. Sigerfoos and L. C. Price, MSC, and Dr. Richard Schneidewind, University of Michigan, Ann Arbor



MERITE
PIG IRON

LIVING UP TO ITS NAME

MORE USED THAN ANY OTHER MERCHANT PIG IRON

P M

PICKANDS MATHER & COMPANY
UNION COMMERCE BUILDING • CLEVELAND 14, OHIO
CHICAGO • CINCINNATI • DETROIT • DULUTH • ERIE • GRAND RAPIDS
GREENSBORO • INDIANAPOLIS • MINNEAPOLIS • ST. LOUIS • WASHINGTON
IRON ORE • PIG IRON • COAL • COKE

SIXTY-SEVEN YEARS OF
SERVICE TO INDUSTRY

Quantity
PRODUCTION
of
GREY IRON CASTINGS

✻

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

✻

ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE

Plans Progress For

AFS

CLEVELAND CONVENTION

PLANS of the many details in presenting the national convention of the American Foundrymen's Society in Cleveland, May 8 to 12, have progressed in recent weeks through meetings of technical committees, exhibit groups, members of the host chapter board of directors, and the AFS national office staff in establishing convention programs, committees and policies.

The official 1950 floor plan for the Foundry Show in Cleveland Public Auditorium, including rules and regulations, general information and space application blanks, were mailed to all past and prospective exhibitors Nov. 28.

Considerable interest in the 1950 Foundry Show has already been evidenced by the large number of foundry equipment manufacturers who have announced their intentions of having operating exhibits in this major foundry event.

Plans for the convention's technical program are nearing completion and a tentative schedule of events will be mailed to the entire membership in the near future. Several AFS technical divisions have already met to formulate their convention plans, and a large number of technical papers for presentation at the convention have been approved.

The AFS Gray Iron Division has scheduled a symposium on the production of nodular iron to be sponsored jointly with the Malleable Division. Roundtable luncheons and shop course sessions are also receiving attention. The Shop Course Committee met Nov. 8 to make plans for these popular evening sessions, which are open to foundrymen at no extra charge.

The Malleable Division, in addition to the joint sponsorship of the symposium on nodular iron, plans to include presentation of a paper sponsored by its Controlled Atmosphere Annealing Committee. The Time Study and Methods Committee has tentatively scheduled a session on the development of bench coremaking standards, and a joint meeting with the AFS Cost Committee for a presentation of papers showing how co-ordination between standards and cost departments gives maximum service to management.

Plan Sand Shop Courses

High lights planned are the annual Sand Shop Courses; a discussion of cleaning room equipment sponsored by the Plant and Plant Equipment Committee; two sessions of the AFS Educational Division relating to (1) college level foundry courses, and (2) trade and high school level and/or in-plant training; and a symposium on the properties of centrifugally-cast metals, sponsored by the American Society for Testing Materials and the American Foundrymen's Society.

The Aluminum & Magnesium Division, following a meeting in Cleveland Oct. 3, tentatively plans to present papers on magnesium fluxing, fluid flow of metals in molds (experiments in gating), a progress report on the division's research project at Battelle Memorial Institute, high-strength magnesium alloys, Canadian magnesium casting practices, and nonferrous metal practice. The Aluminum & Magnesium Roundtable will be a feature of the division's program at this convention.

The AFS Northeastern Ohio Chapter, host to the 1950 Foundry Congress and Show, met in Cleveland Nov. 10 with Al Hilbron, AFS convention and exhibits manager, at which time various host chapter committees for the convention were established. Members of these committees will be announced shortly. The General Committee appointed by the chapter to supervise various convention arrangements has Walton L. Woody, National Malleable and Steel Castings Co. and national AFS vice president, as honorary chairman and the following members: Chairman, William G. Gude, THE FOUNDRY; vice chairman, Fred J. Pfarr, Lake City Malleable Co.; secretary, Arthur J. Harlan, Hickman, Williams & Co.: treasurer, F. Ray Fleig, Smith Facing & Supply Co.; Walter E. Sicha, Aluminum Co. of America; Howard C. Gollmar, Elyria Foundry Division, and Henry J. Trenkamp, Ohio Foundry Co.

The AFS Apprentice Contest, now in its 27th year, opened Sept. 17 and will continue until early in April. The national judging will take place in Cleveland. Five divisions are represented: gray iron molding, nonferrous molding, steel molding, patternmaking, and metal patternmaking (new this year). All first-place winners in the five divisions will be present, the society bearing the travel expense to and from the convention. At the annual business meeting, AFS President Edwin W. Horlebein will present each winner with the $100 award prize. Four chapters—Detroit, Northern Illinois & Southern Wisconsin, Southern California and Wisconsin are already entered. Several more chapters are planning to enter and many companies have announced their intentions of conducting in-plant contests in preparation for the national contest to be staged in Cleveland.

A Southern SUPPLY HOUSE

Distributors f

THE BIGGEST NAMES IN T

SUPPLIES

NATIONAL LEAD COMPANY
(Baroid Sales Division)
World's Largest Producers of Genuine Western Bentonite

ILLINOIS CEREAL MILLS, INC.
CERES Core Binder-CERE-ATOM Core Binder

SMITH OIL & REFINING COMPANY
LO Brand Core Oils, Liquid Parting

CERTIFIED CORE OIL COMPANY
Golden, Unique, Rapidry Brand Core Oils

MILWAUKEE CHAPLET & MFG. CO.
Standard Single and Double Head Thread Stem Chaplets, Motor Chaplets, Schmitz Chaplets, Radius Chills, Core Plates, Mold Anchors

LOVEJOY-PATENT SPECIALTY CO.
Hinge Tubes, Door Catches, Dove Tails, Tin Shell Chaplets, Automatic Screw Machine Products.

SMITH & RICHARDSON MFG. CO.
Perforated Chaplets, Skim Gates, Babbit Anchors, Hinge Tubes, Cover Lifts, Dovetails, Catches, Screw Shells, Perforated Metal Sheets

CRESCENT BRASS & PIN COMPANY
Radiator Chaplets, Boiler Chaplets, Tinned Core Plates, Taper Drive Plugs

J. S. McCORMICK COMPANY
Chill Coils, Core Ties, Cut Wire

CHARLES PETTINOS, INC.
Graphite, Plumbago, Core Wash, Ingot Mold Wash

CLEVELAND METAL ABRASIVE CO.
20th Century Steel Shot & Grit

BUCKEYE PRODUCTS COMPANY
Avon Non-Silica White Parting, Patented Flask Pins & Guides, Buckeye Furnace Cement

STANDARD SILICA CORPORATION
Microsil Silica Flour, Black Hawk Core Sand, Sand Blasting Sand

CEDAR HEIGHTS CLAY & COAL CO.
Ohio Bond Clay, Fire Clay

EASTERN CLAY PRODUCTS, INC.
Revivo Core Paste-Much Stronger-Much Better

FREEMAN SUPPLY COMPANY
Dow-Metal Pattern Plates
Pattern Shop Supplies

FOUNDRY SERVICES, INC.
Brass & Aluminum Fluxes, Feeding Compounds

PITTSBURGH METALS PURIFYING CO.
Carbon Free Liquidizer, Ferrous Fluxes

SEYMOUR & PECK COMPANY
Tri-Ply Riddles

C. M. SMILLIE & COMPANY
Core Box Vents, Slotted or Screened, Inserting Tools, Turned Parts, Precision Screw Machine Products

STOLLER CHEMICAL COMPANY
AKRO Hardwood Flour Compound

C. K. WILLIAMS COMPANY
Foundry Iron Oxide for Cores

We specialize in Chaplets, Steel Flasks, Graphite, Bentonite, Cereal Binders and Core Oils

FOUNDRY SERVICE

Phones: DAY • 4-4750 NIGHT • 3-3490
24 HOUR SERVICE

BIRMINGHAM

FOR Southern FOUNDRIES

for . . . . . .

N THE BUSINESS

EQUIPMENT

BLACK, SIVALLS & BRYSON, INC.
Steel Flasks, Flask Pins & Bushings, Core Plates, Bottom Boards

THE ADAMS COMPANY
Snap & Slip Flasks, Jackets, Molding Machines, Sprue Cutters

MILWAUKEE CHAPLET & MFG. CO.
Tessmer Sprue Cutters, Milwaukee Die Filers

WM. DEMMLER & BROS.
Core Blowers

WADSWORTH EQUIPMENT COMPANY
Core Making Machines

VALLEY MANUFACTURING COMPANY
Wheel-over Core Machines, Economy Core Pasters

STRATTON MANUFACTURING CO.
Quickdraw Core Stripper

ALAMO IRON WORKS
Core Sand Mixers (Bench)

CONSTRUCTION MACHINERY COMPANY
Wonder Core Sand Mixers (Large)

GREAT WESTERN MFG. COMPANY
Combs Gyratory Electric Riddles

FOUNDRY SUPPLIES MFG. COMPANY
Rotoplane Speed Sifters, Red Electric Vibrators

THE MONK TOOL COMPANY
Monk's Molders Tools

NEW HAVEN VIBRATOR COMPANY
Branford Air Vibrators, Flask Rappers

CLEVELAND VIBRATOR COMPANY
Air Vibrators

MULTIPLEX MACHINERY CORP.
The Multi-Mixer for mixing Core Sands, Molding Sands, and Cupola Patch Mixes

CAMPBELL-HAUSFELD COMPANY
Melting Furnaces

JAS. A. MURPHY & CO.
Compressed Air Equipment, Sprayers, Blow Guns, Suction Sand Blasts, Clay Roll Presses

HAUCK MANUFACTURING CO.
Equipment for Cupola Lighting, Mold Drying, Furnace Heating

THE INDUSTRIAL EQUIPMENT CO.
Crane Ladles, Mixing Ladles, Bull Ladles, Ladle bowls, Shanks, Tongs, etc.

SUNDRIES

Leather Fillet, Vent Wax, Ladles, Shanks, Hi-Quality Molders Shovels, Pattern Letters, Blue Buck Bellows, Rawhide Mallets, Rubber Mallets, Bench Rammers, Mauls, Flax Swabs, Smooth-On, Ramtite, Leslie Bulb Sponges, Chrome Leather Leggings, Molders Brushes, Parting Bags, Shake Facing Bags, Pattern Plates, Crucibles, Sprinkler Cans, Pistol Sprayers, Spray Cans, Thompson Adjustable Flask Clamps, Tongs, etc.

Largest Stocks South

E COMPANY

M, ALABAMA

Wm J. Bach, President
Wm. K. Bach, Sales Mgr.

"WE ALWAYS GIVE GOOD SERVICE"

NEW YORK FOUNDRY CONFERENCE

Is Held at Syracuse University

By ROBERT H. HERRMANN
Associate Editor
THE FOUNDRY

FEATURING as its theme, "Developments in the Foundry Industry," the New York State Regional Foundry Conference drew an attendance of 267 to its program at Syracuse University, Syracuse, N. Y., Nov. 25-26. The conference was sponsored by the Central New York, Eastern New York, Western New York, and Rochester Chapters of the AFS and the College of Applied Science of the university.

Preconference demonstrations comparing gray cast iron with nodular cast iron were conducted in the university laboratory by Drs. B. J. Lazan and F. R. Morral and members of the materials engineering department staff. Results of the tests showed an as-cast gray iron specimen to have a tensile strength of 46,700 psi and 18,750,000 modulus of elasticity. The as-cast nodular iron bar showed a tensile strength of 75,000 psi and modulus of elasticity of 24 million. Annealed and normalized nodular irons showed tensile strengths of 65,620 psi and 127,500 psi and moduli of elasticity of 22.5 million and 26 million, respectively.

Visitors Welcomed

The conference was opened officially by E. E. Hook, Dayton Oil Co., Syracuse, general conference chairman. Welcoming addresses were made by J. F. Livingston, Crouse-Hinds Co., Syracuse, Central New York Chapter chairman; and F. Gordon Smith, executive secretary, Syracuse University. E. W. Horlebein, national AFS president, also spoke briefly.

"Latest Developments in Nodular Iron" was the subject discussed at the first general session. J. C. H. Stearns Jr., manager, ingot sales, Magnesium Division, Dow Chemical Co., Midland, Mich., was the principal speaker, with Frank Wheeler, Kimman & Wheeler Co., Syracuse, as chairman.

Mr. Stearns stated that two of the questions still to be answered about nodular iron concern the mechanism of the reaction when magnesium, alloys of magnesium, or cerium is added to ordinary gray iron to produce the material, and whether or not a nucleus exists in the nodule form. Considerable work on the latter question is being done by Dow Chemical Co., using the electron microscope. Analysis of graphite in nodular iron indicates that the nucleus, if it exists, might contain magnesium, iron, and carbon as well as other elements.

As to the best iron to start with in making nodular iron, Mr. Stearns stated that there is no practical difference. Although nodular iron properties are not dependent upon carbon, Mr. Stearns pointed out that somewhat better properties are obtained when the carbon content is higher. Because of its great affinity for magnesium, sulphur should be kept low in order to obtain the greatest efficiency from the amount of magnesium used. He went on to say that titanium has an adverse effect on the action of magnesium.

Many magnesium alloys have been used as nodulating agents. It does not appear likely that any one type of alloy addition will be the universal choice.

As yet, the use of pure magnesium is not recommended because of its great reactivity. Experiments are being conducted by Dow Chemical Co. to determine a safe, economical way of introducing pure magnesium into molten iron. When it is found, pure magnesium will prove desirable in many cases when making nodular iron.

A written discussion based on a digest of the material published to date on nodular iron and delivered by Dr. F. R. Morral, associate professor, Department of Materials Engineering, Syracuse University, will be presented in an early issue.

A panel of experts assisted in answering questions during the open discussion period. They were: W. F. Morton, Anstice Corp., Rochester, N. Y.; George Hochsgang, Straight Line Engine Co., Syracuse; J. W. Clifford, Bison Casting Co., Buffalo; K. F. Echard, Eddy Valve Co., Waterford, N. Y., and Gilbert L. Cox, International Nickel Co., Rochester. A summary of their answers to a number of questions follows:

Combined carbon in nodular iron varies with cooling conditions. It is around 0.30 to 0.40 as cast, around 0.85 when normalized, while a normal anneal would drop it to below 0.30.

It is possible to obtain ferritic structure around the nodule.

Nodular iron shows up superior to gray cast iron in static and dynamic tests.

As yet, not many industries are writing nodular iron into their specifications.

Nodular iron can be made by adding both cerium and magnesium although the cost is greater than by using magnesium alone. No advantage is gained.

Basic irons should contain below 0.05 per cent phosphorus to obtain the greatest ductility in as-cast nodular iron, although good properties have been obtained with as much as 0.60 per cent phosphorus.

Corrosion resistance depends on the use to which the part is put. Nodular iron acts more like steel in this respect.

Gray cast iron withstands greater heat shock, such as encountered in railroad brake shoes, because the flake graphite acts as a cushion.

Preliminary tests indicate that there is little difference with respect to pinholing in thin sections of nodular and flake graphite irons. The same foundry practices regarding pouring temperature, facings, etc., apply for both irons.

Discusses Industrial Research

At the Friday luncheon, Dr. R. E. Montanna, director, Institute of Industrial Research, Syracuse University, spoke on "Research and New Developments." He described the policies and operation of the university's institute which was started in 1947, and outlined some of the benefits of such a program to the university and to industry. He stated that research is a form of insurance which businesses may use to meet future competition, commenting that few producing units which keep abreast of the times ever fail. M. J. O'Brien, Symington-Gould Corp., Depew, N. Y., was chairman of the luncheon meeting.

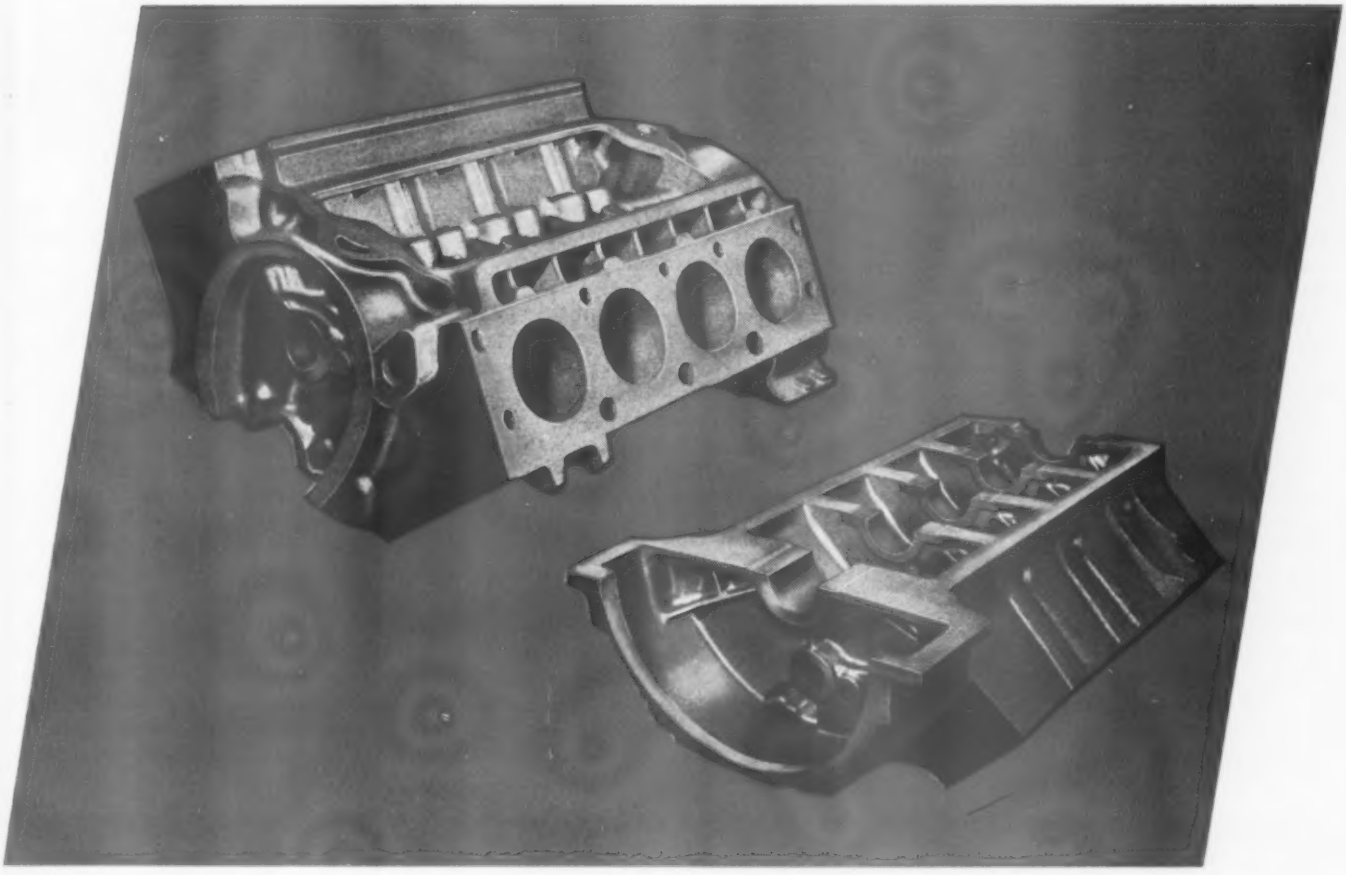
Principal speaker at the general malleable iron session was James H. Lansing, consulting engineer, Malleable Founders' Society, Cleveland. H. P. Blumenauer Jr., Albany Castings Co., Voorheesville, N. Y., was chairman. Co-chairmen were Carl Webber, Frazer & Jones Co., Syracuse; Ken Mason, Albany Castings Co., and John Goetz, Acme Steel & Malleable Co., Buffalo.

Mr. Lansing presented a brief history covering the development of malleable iron castings in this country, and pointed to the extensive use

(*Continued on page* 104)

BUFFALO PATTERN WORKS

"Since 1893"



These New Motor Blocks Are Made With High Accuracy Buffalo Pattern Works Equipment

Buffalo Pattern Works recently completed several duplicate sets of machined, high-speed production equipment to produce this late model cylinder block with a low scrap ratio and low machining cost. This brand of skill has been the hallmark of Buffalo Pattern Works for over 57 years.

We invite you to consult us regarding your production pattern requirements.

BUFFALO PATTERN WORKS

830 HERTEL AVE. BUFFALO, N. Y. RI. 3512

(*Continued from page* 102)

of such castings in today's transportation and farm implement industries. He showed examples of fabricated items which, when redesigned for and cast in malleable iron, proved to be stronger and lighter, and in other ways better adapted to the use intended. He pointed out that 2 or 3-in. sections can be malleablized as easily as 1/16-in. sections, and in referring to pearlitic malleable castings, said that they offer higher strengths with reduced elongation.

Immediately following his talk the Malleable Founders' Society motion picture, "This Moving World," was shown.

Discussion produced the comment that about 20,000 tons out of the nearly 1 million tons of malleable iron produced yearly is pearlitic malleable iron. It is used for items requiring good resistance to wear and corrosion. In a discussion of surface hardening by induction heating and flame hardening it was pointed out that reduction in elongation through flame hardening depends on the amount of surface hardened.

Walter E. Sicha, assistant chief, Cleveland Branch, Aluminum Research Laboratories, Aluminum Co. of America, Cleveland, was principal speaker at the nonferrous session. Leonard Greenfield, Samuel Greenfield Co., Buffalo, was chairman. Mr. Sicha discussed progress made by the aluminum foundry industry during recent years, touching briefly on the trends in production volume, processes, foundry practice, metallurgy, and product design.

He mentioned the use of aluminum alloys in investment casting and centrifugal casting, stating that the latter method assists production of sound parts in alloys that do not have particularly good casting characteristics when cast in sand or permanent molds. He advocated use of a more permeable and lower moisture content synthetic molding sand in aluminum alloy founding. Such a sand aids in reducing casting defects caused by steam. However, it has the disadvantages of producing castings with somewhat rougher surfaces and requires more carefully controlled reconditioning.

He touched on the use of synthetic resin core binders and the use of dielectric heating for core baking, as well as methods for preventing and eliminating hydrogen in molten aluminum. With respect to reducing the ratio of gate and riser weight to casting weight, he discussed the use of exothermic materials which may be inserted in risers or placed at the base of risers.

In the field of metallurgical developments, Mr. Sicha commented that activity in aircraft jet engine design has stimulated study of aluminum alloy compositions that might provide casting alloys with higher mechanical properties at elevated temperatures. Mr. Sicha concluded by discussing some of the problems involved in developing cast aluminum parts for automatic transmissions used in automobiles and in the expanding use of aluminum alloys for bearings.

"General Foundry Practice" was the subject discussed by William Ball Jr., R. Lavin & Sons Inc., Chicago, at the steel session. Al Diebold, Atlas Steel Casting Co., Buffalo, was chairman. Co-chairmen were Max Ganzauge, General Railway Signal Co., Rochester; J. Saunders, Tonawanda Electric Steel Casting Corp., North Tonawanda, N. Y., and Chester Richards, Adirondack Foundry & Steel Corp., Watervliet, N. Y.

Mr. Ball stated that although new developments in the foundry industry are stimulating and quick to catch foundrymen's attention, there are many daily routine jobs that offer foundrymen a wealth of opportunity to better the industry.

One of the ways he pointed out was the more efficient use of manpower. He stated that there are three essentials in a foundry—men, materials, and machines. Although a high degree of development has been achieved in the use of materials and machines, foundries have not kept abreast of the times with regard to men.

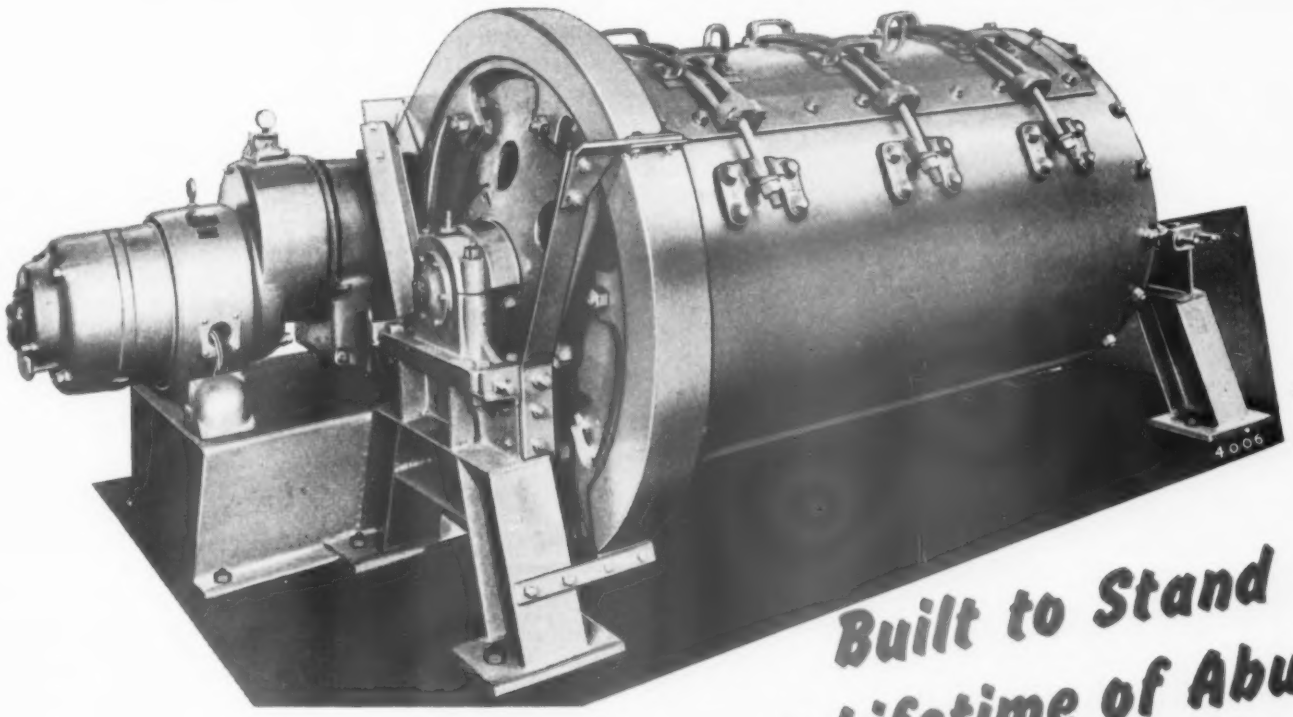
He then discussed foundry tools—patterns, flasks, and sand—and foundry operations—molding, melting, gating, inspection and testing, cost ac-

(*Concluded on page* 106)

Views of some of the speakers and of one of the laboratory demonstrations at the New York conference

SLY TUMBLING MILLS

THE STANDARD OF STURDINESS



Built to Stand a Lifetime of Abuse!

In 1915 we built Sly Tumbling Mills and have been building them ever since. Many of the earliest ones are still in use.

Today we are building Sly Tumbling Mills immeasurably more sturdy—for even longer life. They have won widespread recognition as the Standard of Sturdiness.

Modern throughout:

- Roller bearings, extra large
- Individual motor drive for operating flexibility
- Positive brake for stopping and holding the mill securely for loading and unloading
- Push button control

All add up to . . .
safe and economical operation.

Use modern equipment to combat high costs.
Sly engineers will help you solve your tumbling problems. Write us.

THE W. W. SLY MANUFACTURING CO.

4753 TRAIN AVENUE • CLEVELAND 2, OHIO

Representatives in New York • Chicago • Philadelphia • Detroit • St. Louis
Toronto • Minneapolis • Cincinnati • Rochester • Los Angeles • Birmingham

(*Concluded from page* 104)

counting and records, and maintenance.

At the conference dinner, Nov. 25, E. W. Horlebein, national AFS president, spoke briefly on the progress of the foundry industry under the AFS, and of the value of regional foundry conferences.

Principal speaker was Dr. T. V. Smith of Syracuse University. He stated that the human equation in any phase of life is the hardest thing to deal with and he suggested three rules which might serve as a guide.

The Golden Rule works satisfactorily only with people who are equal in culture, education and benevolence of spirit. If it fails, he suggested the Silver Rule of "don't do to others what you wouldn't like them to do to you." And as a final resort he suggested the Iron Rule of "Don't let the other guy do to you what you wouldn't do to him."

The first Saturday morning session dealt with sand, and the principal speaker was Harry W. Dietert, Harry W. Dietert Co., Detroit. Dr. H. Reis, Cornell University, was honorary chairman, and Dr. D. C. Williams, Ohio State University, chairman. Co-chairmen were William Parker, General Electric Co., Elmira, N. Y.; Jasper Wheeler, Wheeler Brass & Aluminum Co., Troy, N. Y.; A. J. Murrer, Gleason Works, Rochester, and E. Deutschlander, Worthington Pump & Machine Co., Buffalo.

Mr. Dietert discussed the importance of foundry sand in the quality era of today as opposed to the quantity era of the yesterdays. In his opinion, present day foundry literature has a negative appeal. It stresses castings defects and how to remedy them. He advocated emphasizing quality when referring to foundry products. Place emphasis on casting appearance—doll it up the way many other products are sold.

One of the recent developments in molding materials which may be of help in improving casting surface finish is coke sand, which is coke ground to the same grain sizes as silica sand and bonded with a refractory. It has a number of disadvantages in that it produces excess sulphur fumes at shakeout; it requires great care to avoid getting kish in the mold; and its cost is relatively high. According to Mr. Dietert, however, it has possibilities as a sand additive. Additions of 25 to 50 per cent have produced good, clean castings.

When asked about the thermal conductivity of such a sand mixture, Mr. Dietert said that no figures are available. However, thin sectioned castings have been poured successfully in the material with nonferrous metals and steel. Molds made of the materials have high reducing atmospheres.

The concluding general session was on the subject of motion study. Prof. B. H. Norem, College of Applied Science, Syracuse University, was the speaker. Chairman was Prof. E. Syrene, Syracuse University.

Define Motion Study

Professor Norem defined motion study as the analysis of movements performed by a man doing manual work. It might find profitable application in foundries where a great part of the work is manual and often requires considerable hard effort and a large degree of skill. Furthermore, foundry employees often work on a piece-work basis, requiring even harder work by reason of speed in order to increase earnings.

Professor Norem indicated that application of motion study to determine a better method of doing a foundry job might permit an employee to make better use of his skill and time. Consequently, the improved method would benefit both the worker and the employer. He advocated that motion study should be made before a job is begun, as part of a carefully planned, scientific approach to determine the best practical method of performing the job.

Two movies were shown at the conclusion of his talk—one prepared by Ralph M. Barnes, University of Iowa, on application of motion study principles, and the other taken by Professor Norem at Crouse-Hinds Co., Syracuse.

Prof. Peter Kyle, Cornell University, was the speaker at the Saturday luncheon with Kenneth Proud, Anstice Corp., Rochester, as chairman. Professor Kyle's subject was "Training Foundry Engineers."

Top two views are of the speakers' table at the conference banquet. The lower photo shows committee members and guests. Left to right, are: John Feola, Crouse-Hinds Co., Syracuse, publicity committee; L. D. Wright, U. S. Radiator Corp., Geneva, N. Y., program committee chairman; J. C. H. Stearns Jr., Dow Chemical Co., Midland, Mich., speaker on nodular iron; E. E. Hook, Dayton Oil Co., Syracuse, general conference chairman; J. F. Livingston, Crouse-Hinds Co., conference secretary, and E. W. Horlebein, national AFS president

Installed in 1937

and still competitive and highly efficient today

BOTH past and present performance of the Bartlett-Snow equipment in the grey iron foundry of this large mid-western automobile manufacturer, demonstrates the ability of Bartlett-Snow engineers to accurately analyze foundry problems, and then design, build and install equipment that will repay its initial cost within a short time,—and return handsome profits to the purchaser for years and years thereafter.

The shakeout and spill sand in this foundry is collected on conveyors in the basement, passed through a rotary cooling screen, mulled and aerated. The prepared sand is then handled on an inclined 24" belt conveyor (see view above) eliminating the need for bucket elevators, and distributed over the fly wheel line molding machines. Sand not needed by the eight molding station on the fly wheel line is carried to the head line on a cross belt, thus permitting sand to be distributed to two complete loops. The continuous mold conveyor loop shown above consists of 95 cars of Bartlett-Snow's heavy duty, two axle, four wheel design with steel plate tops 20" wide with 5'-0" centers.

Let the Bartlett-Snow foundry engineers, with their long and intimate experience with the needs of practical day to day foundry operation, work with you on your next sand, mold, or castings handling problem. It's your assurance that all equipment will be designed to adequately serve both present and future needs; and synchronized and coordinated into an efficient, compact, profitable and easy to operate unit. The C. O. Bartlett & Snow Company, Cleveland 5, Ohio. Engineering representatives in New York, Baltimore, Detroit and Chicago.

BARTLETT-SNOW
CLEVELAND 5, OHIO

DESIGNING AND CONTRACTING ENGINEERS

For the Foundry Industry

SAND, MOLD AND CASTINGS HANDLING EQUIPMENT

Man-to-Man

ON THE MOLDER'S BENCH

"Price Cutting by the Pound"

By RALPH L. LEE

JUST got back from a 10,000-mile speechmaking trip with a bad case of geographical indigestion. All I hope is that neither Heaven nor the other place has a railroad, an airplane or a hotel in it. But anyway, I saw a lot of foundries along the way and heard and made a lot of shop talk.

While the talk naturally covered just about everything that can be talked about in the foundry, the subjects that seemed to be coming up the most were *Getting Enough Business* and *The Low-down Bums Who Are Cutting Below Rock-bottom Prices.* Of course, being just an amateur and with the Lee Foundry always in the red, all I could do was listen and learn.

What I should do on a long trip like this is to take notes, but for some reason I never get around to it. In spite of not doing it, though, the most important or unusual items always seem to have a way of working on up through the odds and ends of information for special attention.

On this trip the item that stuck up like a sore thumb, and as something more than a happenstance, was that the foundries who seemed to be the least worried about getting business and the price cutting going on, were those who did not sell their castings by the pound, but by the piece.

Then another thing that struck me as being different from what one would expect, was that these least worried foundrymen kept right on being darned particular about the jobs they would or would not accept in spite of the times. On the other hand, the foundries who were most worried would take any piece of business they could lay their hands on, whether or not they had the flask equipment, melting facilities, room or experience. At first I thought that maybe I was seeing things or doing a bit of wishful thinking, but the more I saw as I went along the more certain I became that this was no pipe dream.

Then I noticed another thing. These less worried foundries were not only choosey about the jobs they would take, but just as finicky about the patterns that folks brought in for them to use. They seemed to have certain high standards from which they simply wouldn't back down for anybody. I noticed, too, that they would go to no end of trouble selling their customers on just the right kind of pattern equipment they should have for the job.

In fact, I would say that these folks were finicky on just about everything they did, sort o' set on going the last mile — doing everything up brown. All of them spent a lot of time getting ready to do a job—not just on patterns, but everything—much more time than the mine-run outfits I saw.

In the cleaning rooms I saw other signs of going the last mile. The work there didn't seem to be done with a lick and a promise, as though it was just another one of those curses of the foundry business to be suffered and gotten over with. There seemed to be a certain respectability attached to the whole operation.

Without exception, and I am not stretching the point one bit, every last one of the least worried foundries kept its place spic and span. If there had ever been any doubt in my mind as to a definite connection between good housekeeping and good business, this trip settled the matter once and for all.

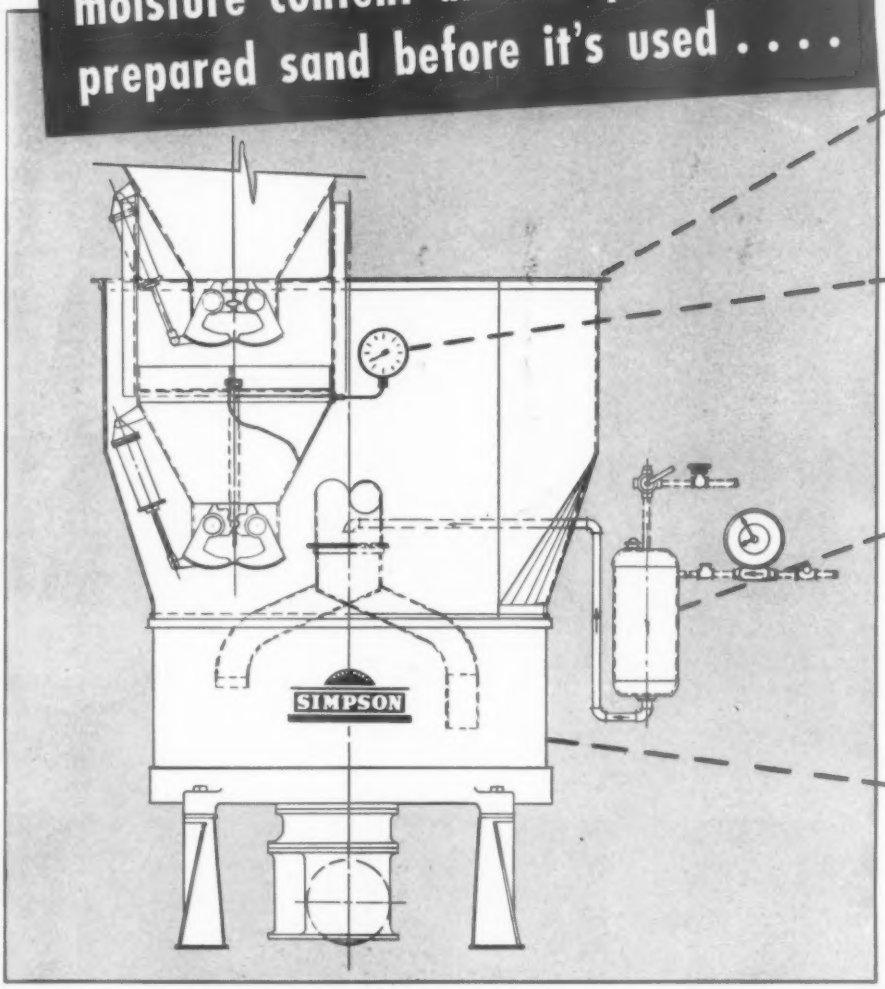
But of all the things I learned on this trip, the most important by far was that the shortest distance between two points in the foundry business during times of keen and cut-throat competition is not a straight line—if that line means only cutting the price per pound of castings f.o.b. the shipping room door. In fact, the foundries apparently the least concerned with competition were those which seemed to realize that the values they furnished their customers were of such a nature they couldn't be weighed on scales and consequently couldn't be sold by the pound.

These foundrymen, instead of cutting their operations to the quick, seemed, if anything, to invest more time, caution and pains on their work to the end that if any price cutting was going to be done at all, it would be done by the customer on his own product as a result of less scrap after machining, less metal to be machined off, better and more stable stopping points for jigs and fixtures, and smoother castings for less grinding, buffing and polishing.

While I didn't have the time to get deeply into the matter, I imagine that the very same steps taken to give the customer a hard-to-match bargain in the casting service he was getting, also backed up into the shop of the supplier, helping him to get

(*Concluded on page* 111)

STOP GUESSING—KNOW the moisture content and temperature of prepared sand before it's used . . . .



NATIONAL COOLING HOOD

NATIONAL MOISTURE MASTER

NATIONAL WATER INJECTOR

SIMPSON Intensive MIXER

SIMPSON MIXERS equipped with the NATIONAL Cooling Hood—Moisture Master—and Water Injector provide the highest quality prepared sand at controlled temperatures and with accurate moisture content.

National Engineering Company specialists have again been of service to the foundrymen by eliminating any guesswork or "feel" from sand preparation. The arrangement shown here is a simple method of assuring accurate, positive moisture and temperature control of your prepared sand. *Be sure to write for the new Bulletin 500 which fully describes all of these units.*

SIMPSON Intensive MIXERS

NATIONAL *Engineering Company*

608 Machinery Hall Bldg. • Chicago 6, Illinois

Manufacturers and Selling Agents for Continental European Countries—George Fischer Limited, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd., Sydney, Australia

Answers to 5,000,000 QUESTIONS

U. S. Rubber Laboratories create grinding wheels to solve millions of problems

THE ANSWER TO THE $64.00 QUESTION. *The problem:* To prove this grinding wheel surpasses required specifications. *The answer:* It does! This "U.S." lab technician proves it with a touch of her finger, which puts wheel under tons of pressure.

NO GUESSWORK HERE! "U. S." Lab experts have the know-how and know-all on the right wheel to do the best job. They're backed by 86 years of experience and research on the thousands of products made by United States Rubber Company.

WHAT'S YOUR QUESTION? Snagging castings? Grinding ball races? Slabs? Sauce Pans? Perhaps we can solve your specific grinding wheel problems as we have done on previous jobs, involving 5,000,000 possible combinations!

Whatever your problem on bonds or abrasives, our field engineers can give you accurate grinding wheel costs *in advance* and diagnose and solve your problems right in your plant. Write Grinding Wheel Department.

PRODUCTS OF U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

ROCKEFELLER CENTER, NEW YORK 20, N. Y.

(*Concluded from page* 108)

e most out of the expensive things h had to buy by the pound.

Well, anyway, I've made up my mind that if the Lee Foundry should ever expand beyond its present one-man operation, I am going to stay clear of work that can be done and sold by the pound, like sash weights and stuff like that. And another thing, I'll concentrate on those tremendously important trifles which, when all added together, frequently tip the scales when competition is the toughest. I'm going to try to earn my way out of the peddler category into the inside confidence of my customers so I can give them things they want that outsiders don't even know exist, things that can't be weighed or matched by the pound.

Melting Practice

(*Continued from page* 57)

suitable for the production of sound castings.

In general it is unfair to criticize a foundryman because his melting practice does not conform to that used in any other shop. For the conditions in his shop, any foundryman has probably worked out a practice that gives *him* good results, even though the same practice in another shop would give poor-quality metal.

Because it is possible to have a number of consistently satisfactory melting practices it is inadvisable for any foundry pouring good quality castings to change its techniques. Mere conformance to the general pattern is unwise if *your* method gives you good results. As long as the metal poured is gas-free, clean, and of consistently high quality, *your* melting practice is the best one for *you*.

Despite the numerous satisfactory melting practices it is apparent from theoretical considerations that there is one easiest practice, one method most foolproof and least likely to give variable results. It is not the only practice, to be certain, but for oil or gas-fired melting equipment it is the simplest method for producing gas-free metal regularly with a minimum of control.

If you are pouring good-quality metal consistently and experiencing no difficulty with present melting practice, it is not wise to change it. But if your results are variable, and if you have trouble from time to time with certain castings, the techniques to be described may prove helpful.

These suggestions have an added value in that they form the basis of a complete practice which can be used in any foundry desiring to standardize this phase of operation in order to study other variables. By using a fixed melting practice it is possible virtually to minimize metal quality as a factor in producing castings, since there is reasonable assurance that the metal being poured is consistent in quality.

Before discussing specific recommendations for the melting of copper-base casting alloys it may be worthwhile to review briefly the reasons for the appearance of gas porosity in copper-base alloy castings.

Combustion Products Cause Porosity—When gas or oil burns, one product of combustion is water vapor. At the temperatures of molten bronze this water vapor will break down into hydrogen, which can dissolve freely in the liquid metal, and oxygen, which may react with the metal to form oxides. Liquid metals can dissolve large quantities of hydrogen and oxygen (probably as oxides). When the metal freezes it rejects most of the gas it dissolved at the higher temperature. As a casting freezes, the gases rejected from the solidified metal concentrate in the remaining liquid metal. In so doing they (the hydrogen and oxygen) may react again to form steam which, if it cannot escape from the metal in the mold, will produce the defect known commonly as gas porosity. This is by far the commonest form of gas trouble in copper-base alloys, although theoretically hydrogen gas alone can produce holes as it attempts to leave the solidifying metal.

With this brief explanation of why gas trouble occurs in bronzes, consider first the furnaces used in melting brass and bronze alloys. These are: Gas-fired—crucible or reverberatory. Oil-fired—crucible or reverberatory. Coke-fired — natural draft or forced draft. Electric—induction or arc.

Of these furnaces, the coke and electric types will cause the least trouble because there are no products of combustion in electric melting and very little water vapor produced with coke. Oil and gas-fired furnaces are much more widely used, however, and because in these the products of combustion contain large amounts of water vapor as well as hydrocarbons, more trouble is experienced in melting. The fact that burners on oil and gas-fired furnaces get out of adjustment easily makes strict control of the melting atmosphere difficult.

The use of proportioning type burners is recommended where possible. This burner controls the fuel-air ratio so that there is only one valve for the melter to adjust. With a high flame or a low flame the furnace atmosphere is fixed; this eliminates much of the variability (and potentially incorrect melting atmosphere) encountered with oil and gas-fired furnaces.

With almost every type of furnace there is water vapor over the molten metal, if only from the normal atmosphere. When the humidity is high, the water content of the atmosphere is greatly increased, and may be a potential source of gases that can cause casting defects. In this fact may be an explanation for the claim of old-time foundry men who said they "were not able to make sound castings during a thunderstorm."

Recommended Melting Practices—In general, with all copper-base alloys it is wise to melt with an oxidizing atmosphere where there is a slight excess of oxygen or carbon dioxide in the products of combustion. This means, of course, that *all* of the oil or gas is being burned completely. An oxidizing atmosphere over the molten metal minimizes the amount of hydrogen that can dissolve in the metal (by oxidation of the hydrogen). Such practice builds up the oxygen (or oxide) content of the metal. Then, by use of a deoxidizer, such as phosphorus, the excess oxygen is controlled and the result should be sound metal, free of gas porosity.

Tin and Leaded Tin Bronzes—One procedure for melting in gas or oil-fired crucible furnaces that should produce sound castings with tin bronzes and leaded tin bronzes is outlined below:

1. *Charge ingots or heavy foundry scrap first in a crucible that has been cleaned well.* Melting light foundry scrap without a metal bath will reduce the yield in metal and give an excess of dross. Melting in a dirty crucible can cause contamination and dirty metal.

2. *Melt oxidizing.* This can often, but not always, be controlled by the nature of the flame. A smoky, yellow flame usually means an excess of oil or gas; a green flame usually means complete combustion of the fuel. The best method for controlling the furnace atmosphere is to

(*Concluded on page* 114)

FAIRBANKS-MORSE cleans castings faster and more economically with HYDRO-BLAST

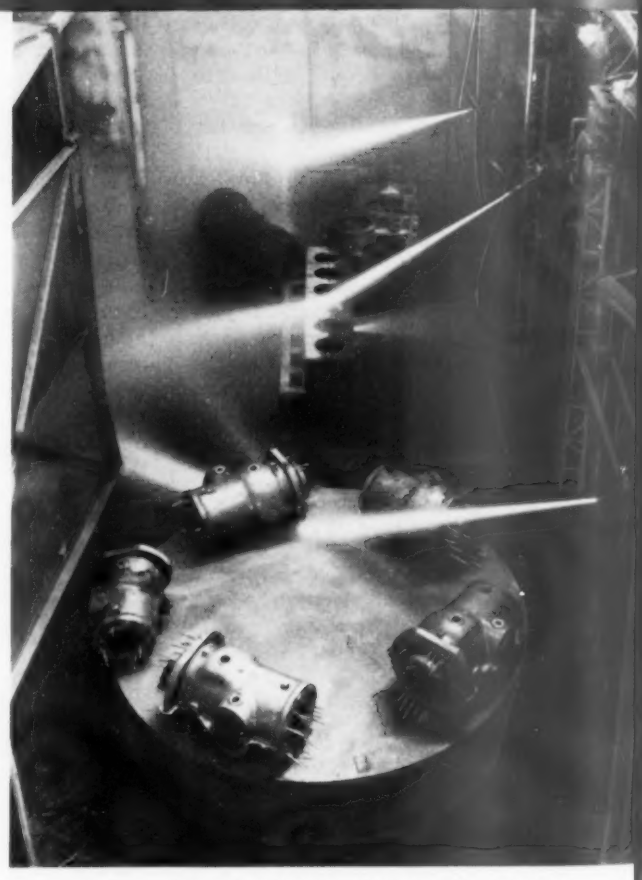
At the Beloit foundry of Fairbanks-Morse a Hydro-Blast unit designed to clean 75 tons of castings at one time is rapidly paying for itself through faster production and cleaning economies. Also, Fairbanks-Morse foundry executives express themselves as "greatly pleased" at reductions in machine shop costs and longer tool life resulting from cleaner castings.

Castings to be cleaned are placed on a central square platform and on two 12-foot turntables —one at either end of the enclosure. Each will accommodate 25 tons of castings.

Three guns of 75 gpm each, operated from control stations outside the enclosure, deliver the cleaning streams of water-and-sand at a pressure of 2000 psi. Each gun is moved laterally or vertically.

Hand-nozzles of 30 gpm capacity are also available for operation inside the enclosure.

Substantial benefits, as enjoyed by Fairbanks-Morse, can be yours through use of Hydro-Blast—the fast, clean, low-cost modern method.



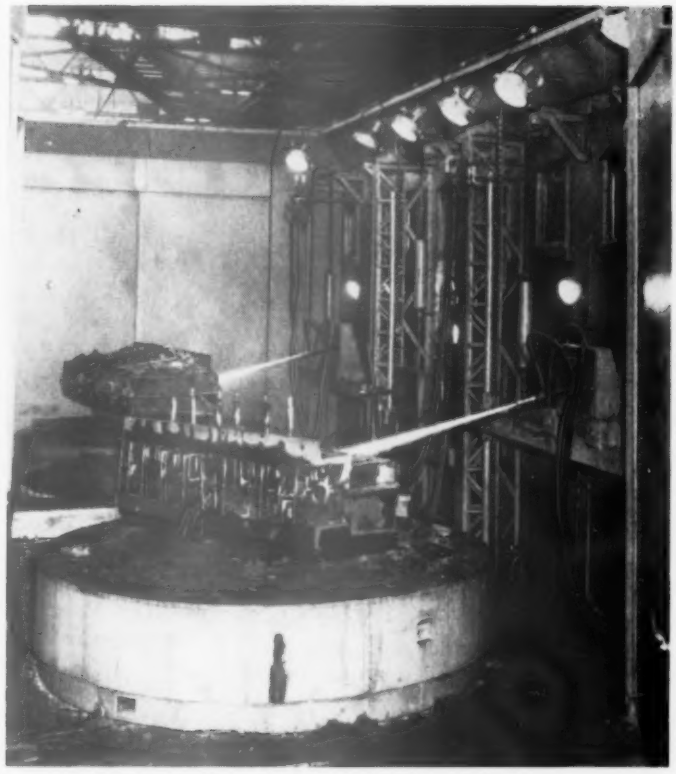
Three guns in operation, controlled from outside the enclosure. "Castings are so clean they look cadmium-plated" says a pleased executive.

You speed up the flow of castings through cleaning operations, with the potent plus-advantage of Hydro-Blast's *remarkable effectiveness in cleaning foundry air.*

HYDRO-

2550 NORTH WESTERN AVE

Removing a clean casting. Comparison with the worker indicates size of the room and turn-tables.



Two guns blasting large cylinder-block castings. Sand and water pass through floor gratings.

This center section can be partitioned off as a separate cleaning room.

The great 75-gallon guns are easily controlled from this outside panel.

There's a type of Hydro-Blast suited to your particular needs. It costs nothing to find out what it will save you —simply talk things over with Hydro-Blast engineers.

-BLAST CORPORATION

CHICAGO 47, ILLINOIS

FOREIGN REPRESENTATIVES

England, Norway, Sweden, Denmark and Finland—Pneulec Limited, Licensee, Smethwick (near Birmingham) England

France and Switzerland—R. Dureuil, 4 Square Du Graisivaudan, Paris 17, France

Belgium—Charles Monseur, 195 Rue Saint Leonard, Liege, Belgium

Italy—Azeta, Viale Tunisia 41, Milano

(*Concluded from page* 111)

analyze the products of combustion with an Orsat apparatus and to use a proportioning burner which is set to give a slight excess of air in the mixture.

3. *Use no fluxes or covers.* The principal objection to the use of covers on the metal is that they may interfere with the desired control of hydrogen by the oxidizing atmosphere. With other than oxidizing melting techniques it may be possible to use some fluxes. Glass as a cover attacks crucibles; charcoal provides a reducing atmosphere over the metal; sand is a very poor cover in that it may be poured into the mold with the metal and cause surface imperfections after machining or polishing. Indiscriminate use of fluxes or covers can be costly and harmful. Nothing should ever be added into or onto metal without a thorough understanding of the reasons for so doing.

4. *Melt as quickly as possible.* The longer the molten metal is exposed to the products of combustion the greater the amount of gases that can be dissolved. Fast melting minimizes this problem. Soaking metal at high temperatures may also burn out volatile constituents like zinc, or produce excessive amounts of oxides on the bath surface.

5. *Do not overheat metal.* As the temperature of the metal increases, the tendency to pick up gas also increases. It is far easier to avoid excess gas pickup than it is to remove gas that has been dissolved in the metal. Also, excessive heating of the metal increases the amount of oxide formed on the surface of the melt.

6. *Take the metal from the furnace with a slight* (50°) *superheat.* Allow enough superheat to permit the necessary handling and still have the desired pouring temperature. This may be 50° or 150°, depending on the time necessary to remove the crucible from the furnace, skim, measure the temperature, and transport the metal to the pouring floor.

7. *Skim the metal clean and allow to stand in air until the desired pouring temperature is reached.* As the clean metal surface stands in air, dissolved gas will tend to free itself from the metal. The use of coolers reduces the amount of time the pot stands in air and thereby reduces the amount of gas removed in this fashion. Adding coolers may produce gas in the metal if any moisture, oil, etc., remains on the cooler surface.

8. *Measure temperature with a calibrated pyrometer.* Unless a pyrometer is kept in good working condition it is valueless. The thermocouple tips commonly used in brass and bronze foundries become defective after numerous immersions in metal above 2400° F. Unfortunately, they will frequently continue to give readings, but these are highly erroneous. Regular checking of pyrometer tips is essential.

9. *Stir in deoxidizer lightly.* When the desired pouring temperature is reached, add 2 oz of 15 per cent phosphorus-copper per 100 lb of melt to the surface of the melt, stir in lightly and pour. It is possible to add either more or less "phos-copper" and obtain good results: 2 oz per 100 lb is known to be an efficient addition with regard to deoxidation and castability. Other deoxidizers can be used but from the viewpoint of cost and performance phosphor-copper is more than adequate for the job.

The melting practice just described will give good results regularly if the various controls outlined are maintained. Deviation in any respect may upset the balance of conditions.

Silicon and Aluminum Bronzes —

1. *Melt oxidizing.*
2. *Use no fluxes or covers.*
3. *Do not overheat.* Gases dissolved at high temperatures may remain in the metal when it cools. Once so gassed, very little can be done to reclaim the metal other than pour ingots and remelt.
4. *Add nothing to the metal.* These alloys are already completely deoxidized (by the silicon or aluminum in the metal). Further additions of deoxidizers may only contaminate the alloy.
5. *Let the pot stand in air as long as possible.* When the desired temperature is reached pour slowly into the mold to avoid splashing.

These are among the easiest of the copper-base alloys to handle, providing nothing more is done to the metal than listed above. Overheating these alloys should be unnecessary since they have excellent castability at comparatively low temperatures.

Manganese Bronzes, Yellow Brasses

1. *Furnace atmosphere is not so critical.* This is true because the high zinc content protects the metal from gas trouble.
2. *Do not overheat.* As the temperature exceeds the boiling point of zinc, considerable fuming takes place and unless ventilation is exceptional the foundry atmosphere becomes unpleasant.
3. *Add zinc to replace that lost in melting.* Chemical analysis of yellow brass castings at occasional intervals will best indicate the amount of zinc being lost. With average furnace conditions, addition of 1 to 2 lb of zinc per 100 lb of melt is adequate.
4. *With yellow brass small amounts* (2 *oz per* 100 *lb*) *of aluminum added prior to pouring will improve castability of the metal.* Too much aluminum in the metal (and ingot) however, may cause considerable difficulty in finishing castings.
5. *No addition should be made to manganese bronze other than the exact amount of zinc necessary to replace melting losses.*
6. *Pouring temperature of high-zinc alloys is not so critical as with many other copper-base alloys.* The most serious objection to unnecessarily high pouring temperatures is the excess of oxides formed; these may find their way into the casting.

Nickel Silver Alloys—Melting practice for this class of alloys varies considerably, and almost every foundry uses a different technique. The wide variety of alloys being used and the necessity for high melting and casting temperatures complicates standardization of procedure. In general, however, alloys with high nickel and low zinc contents are the most difficult to cast because they are capable of dissolving more gas. Lowering the nickel and increasing the zinc reduces difficulties with gas porosity, but tends to increase dross formation.

While no one melting practice seems to produce good castings consistently, the technique listed below has proved satisfactory in many cases, and is theoretically sound.

1. *Melt under oxidizing conditions.*
2. *Use no covers or fluxes.*
3. *Remove the pot from the furnace with necessary superheat, skim clean, and allow to stand in air until pouring temperature is reached.*
4. *Deoxidize with manganese metal* (4 *oz per* 100 *lb*) *if desired.* Good castings have been made with no deoxidizers added. Manganese will not contaminate the alloy should any be left in the metal. Phosphorus, magnesium, silicon, aluminum, etc., all have been used as deoxidizers for nickel silver but each may have some harmful effect on the metal if not completely oxidized out. True degasification of nickel silver can occur only within the limitations of the chemical reactions that can take place. Control of the furnace atmosphere to exclude reducing gases is still the best preventive measure.

Sources of Illustrations

Figs. 1-2—Thomas Paulson & Son Inc., Brooklyn, N. Y.
Fig. 3—Federated Metals Division, New York
Fig. 4—Christensen & Olsen Foundry Co., Chicago

What's the right X-Ray film?

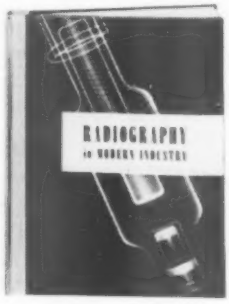
Product:
Gear housing
Material:
Magnesium
Thickness:
Walls varying $\frac{1}{4}$" to 1"
Equipment:
140-kv X-ray unit

ANSWER:

KODAK INDUSTRIAL X-RAY FILM, TYPE M

In a light alloy casting such as this, the radiographer is interested in discovering microporosity, as well as other irregularities that might be present. This requires the highest possible visibility of detail.

Therefore, Kodak Industrial X-ray Film, Type M, is chosen because this film has the highest contrast and finest graininess of all x-ray films.

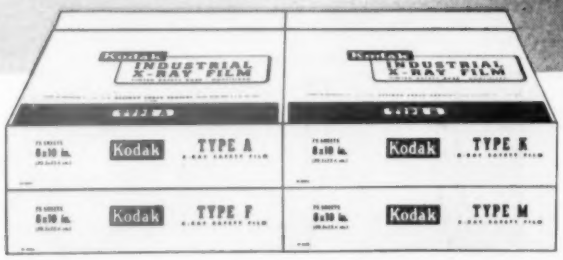


RADIOGRAPHY IN MODERN INDUSTRY

A wealth of invaluable data on radiographic principles, practices, and technics. Profusely illustrated with photographs, colorful drawings, diagrams, and charts. Get your copy from your local x-ray dealer—price $3.

Radiography . . .

another important function of photography



A TYPE OF FILM FOR EVERY PROBLEM

To provide the recording medium best suited to any combination of radiographic factors, Kodak produces four types of industrial x-ray film.

Type M provides maximum radiographic sensitivity, high contrast, and exceptional detail under direct exposure or with lead-foil screens. It has extra fine graininess, and the speed is adequate for examination of light alloys at average kilovoltage and for much million-volt radiography.

Type A offers high contrast with about three times the speed of Type M, but with slightly more graininess. Used direct or with lead-foil screens for study of light alloys at low voltages, and of heavy steel parts with 1000-kv x-rays or radium.

Type K has medium contrast with high speed. For gamma ray work and for x-ray work where highest possible speed is needed at available kilovoltage without use of calcium tungstate screens.

Type F provides the highest available speed and contrast when exposed to x-rays with calcium tungstate intensifying screens. Has wide latitude with either x-rays or gamma rays, exposed directly or with lead-foil screens.

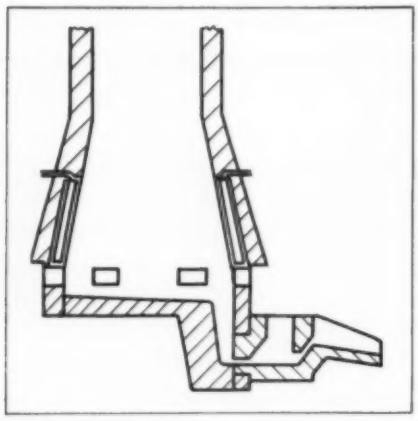
EASTMAN KODAK COMPANY
X-ray Division · Rochester 4, N. Y.
"Kodak" is a trade-mark

Kodak

By EDWIN BREMER

FOUNDRY Developments

IN AN investigation to reduce cupola lining erosion to a minimum, E. S. Renshaw and S. J. Sargood evolved a modification in design which is shown in the accompanying illustration. Various details and results obtained in the investigation were presented in a paper read before the London Branch of the British Institute of Foundrymen and published in *Foundry Trade Journal*, Oct. 13, 1949. As indicated in the sketch, the lower section of the cupola is flared out and uses water cooling. While exact dimensions are not given for the final development, indications are that the cupola is 37 in. inside diam at the top of the cone section and 56 in. at the bottom, with a height of 48 in. from the tops of



the tuyeres. Well in front of the taphole is about 22 in. deep. Tuyeres are 4 to 6 in. above the sand bottom. Water coolers, six in number, are about 22 in. wide, 30 in. high and 4½ in. deep with corrugated faces. Depressed areas of the coolers are filled with refractory which protects the cooler faces as well as obviating additional coke in the charges to maintain the desired melting temperature. Satisfactory tapping temperatures have been obtained with a bed 26 in. above the tuyeres. Indications are that a saving of over 60 per cent in patching material has been obtained with the modified design.

* * *

RECENT news release from Allis-Chalmers Mfg. Co., Milwaukee, states that its precision casting activity has increased in overall production volume and in variety of parts cast. Most of the castings were for the aircraft industry and included structural airframe parts as well as jet engine blading. Among the interesting castings produced were rotor and stator castings for an oil well turbodrill weighing 8 and 12 lb, respectively. These castings were in the form of disks with as many as 30 integral blades. New equipment installed in the firm's foundry included a new batch type curing furnace, and a new injection machine developed especially for making wax patterns for jet engine blades. New investment materials also were developed which exhibit more desirable surface characteristics and greatly increased strength.

* * *

PLOW blades in a sand mulling machine handling over 125 tons a day were subjected to such severe wear that they had to be replaced every 4 days on the average. As an experiment the plows were hardfaced with a type of tungsten carbide granules enclosed in a tube of mild steel applied by welding. Result was that the life of the plows were extended from 4 days to about 6 months, with savings in replacement parts, labor of maintenance, and down time for replacement.

* * *

ADDITION of wetting agents to water used in tempering sand not only aids in providing rapid penetration of moisture, but also is claimed to overcome rapid surface drying, make molding and ramming easier, permit easier patching and finishing, and allow molds or cores to absorb refractory washes more readily. Amount of wetting agent used is from 0.25 to 0.50 per cent, and the latter phases are discussed in U. S. Patent No. 2,313,697.

* * *

OXYGEN practice in melting of stainless steel for castings indicates a decided cost advantage compared with conventional ore practice, according to R. J. Wilcox, *Electric Furnace Steel Proceedings*, American Institute of Mining and Metallurgical Engineers. Power consumption in kwh is reduced approximately 20 per cent; electrode consumption is cut 15 per cent, and man-hours 17 per cent. Lining life appears to be the same with either practice, no deleterious effect having been experienced on the roof or sidewalls from the use of oxygen. What appears to be the most substantial saving is the utilization of larger amounts of alloy scrap, which depends upon the market value of the scrap as compared with the cost of new material.

* * *

MACHINED axles for trucks used to transport castings in Allis-Chalmers' foundry have been replaced with bar stock having the same diameter as the machined sections. Edward Marquardt, an employee of the firm, suggested the simplification which not only saves machining but also provides completely interchangeable parts which fit all types of trucks used in the foundry. New style axle has its collars welded on, and where required the bearings and wheel bores were enlarged to fit the one-diameter shaft.

* * *

PAPER by Paul Bastien and Pierre Azou presented at the recent French Foundry Association meeting indicated that a preliminary heating of cast iron pots for melting of aluminum and its alloys was beneficial. Temperature must be high enough to promote the formation of an oxide coating or scale, and that usually will occur at the regular operating temperatures employed. Time required for a suitable coating will vary with the composition of the cast iron. For plain and low alloy cast irons a 1 to 3-hour exposure is sufficient. For 32 per cent chromium cast irons, the time should be extended considerably.

* * *

FIRST industrial production of the rare radioactive element actinium has been made by Boris Pregel, International Rare Metals Refinery Inc., New York. Actinium is a decay product of uranium 235, and is said to be 150 times as active as radium, making it of utmost value to nuclear physicists in production of neutrons. Other special properties also give promise of finding many vital uses in industry and medicine.

CASE No. 385
Foundry Installation
$5500 YEARLY SAVINGS on $3500 Installation
...plus a smoother flow of production
.....up to 2500 molds handled daily
(a) Savings in Time (estimated) 20%
(b) Savings in keeping orders intact through shakeout and cleaning
QUOTING CUSTOMER'S* STATEMENT:
"The savings resulting from the use of Logan Conveyors is estimated at $5500. The savings in effort alone is large, as our incentive system includes effort allowances. The difference in effort allowance, using Logan Conveyors, is 6% of the total molders' time. The use of Conveyors has also enabled a smoother flow of production. Previous to the installation of the conveyors, all molds had to be carried by the molder and placed on the floor. The metal had to be transported to the molds. The present system enables the molds to pass a central pouring area eliminating transporting of molten metal. Poured molds are pushed along to a shakeout area. Castings are then transported in boxes from the shakeout to the Cleaning Room on conveyors. The use of conveyors also enables us to keep our orders intact through the shakeout and cleaning department. Approximately 2500 molds pass over the conveyors daily."
*Name on Request
Another true Case History showing dollars-and-cents savings effected when Logan equipment is used to conserve effort and time, and to increase productivity all down the line. Perhaps your foundry, too, can make profitable use of Logan Conveyors. If you have a handling problem, write today to . . .
Logan Conveyors
LOGAN CO., 580 CABEL ST., LOUISVILLE, KY.

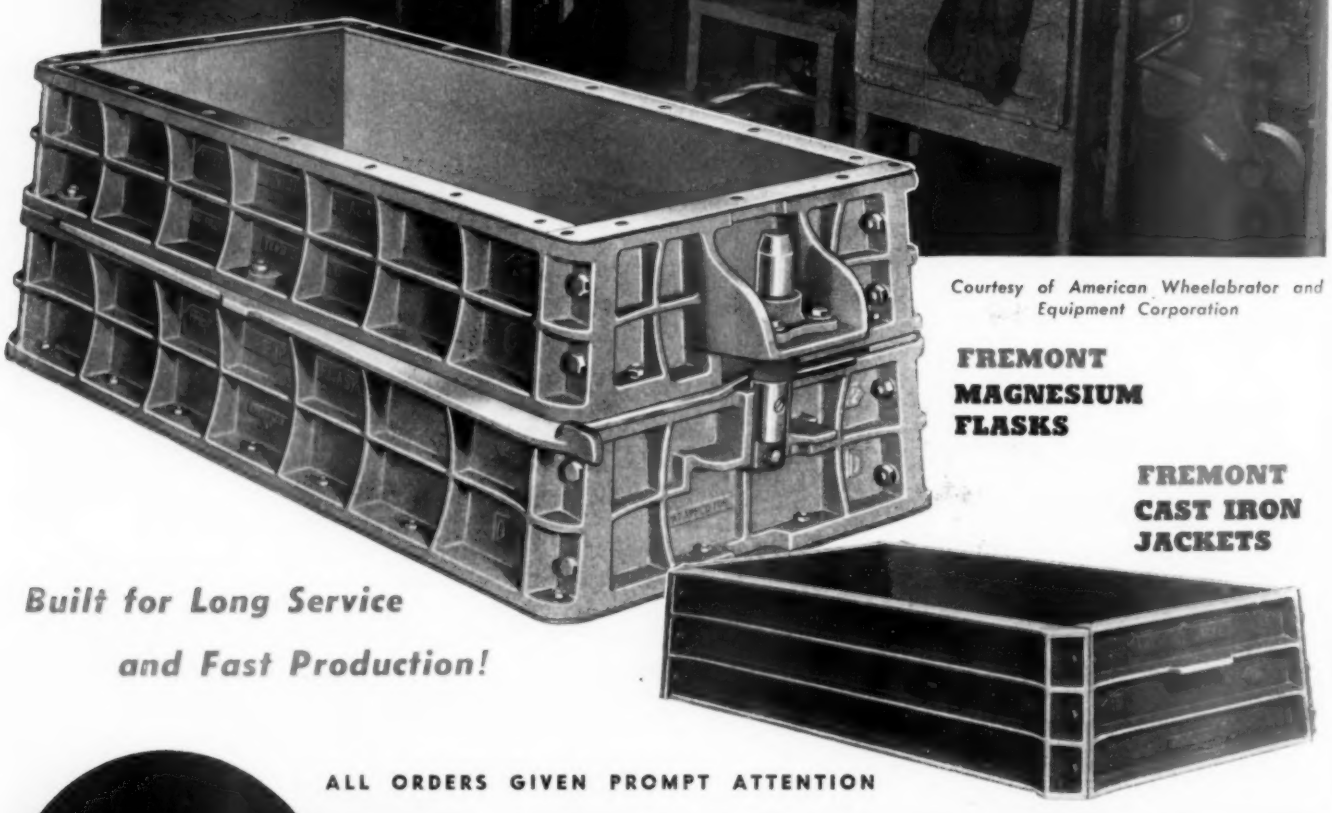
FREMONT FLASKS

Thrive on daily punishment of machine molding at American Wheelabrator

Courtesy of American Wheelabrator and Equipment Corporation

FREMONT MAGNESIUM FLASKS

FREMONT CAST IRON JACKETS



Built for Long Service and Fast Production!

ALL ORDERS GIVEN PROMPT ATTENTION

GROOVLOCK

THE FOOL-PROOF PIN

THE FREMONT FLASK CO.

Fremont, Ohio

FOUNDRY Statistics

Index of Foundry Equipment Orders

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1948	1949
Jan.	380.9	149.9
Feb.	367.3	144.4
Mar.	326.2	190.8
Apr.	412.0	172.0
May	388.5	121.9
June	376.8	164.9
July	456.3	146.6
Aug.	324.7	127.1
Sept.	273.5	166.6
Oct.	296.0	133.5
Nov.	284.4	....
Dec.	243.7	....

Note; Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Foundry Production Workers

ESTIMATED NUMBER:

Type Foundry	Aug. 1949	July 1949	Aug. 1948
Iron & steel	177,300	175,800	225,800
Nonferrous	59,600	58,700	71,100

AVERAGE WEEKLY EARNINGS:

Gray Iron	$52.85	$52.60	$57.88
Malleable Iron	53.12	52.56	58.97
Steel	54.34	55.54	61.21
Nonferrous	60.06	60.53	60.70

AVERAGE WEEKLY HOURS:

Gray Iron	36.6	36.4	40.7
Malleable Iron	34.9	34.9	39.9
Steel	35.8	37.0	41.3
Nonferrous	38.6	38.8	39.8

LABOR TURNOVER RATE (AUG.)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	4.1	3.8	1.6	1.7
Malleable Iron	3.8	3.6	1.1	2.0
Steel	1.7	8.8	0.9	7.7

Source: Bureau of Labor Statistics.

Ingot Brass and Bronze

(Shipments in net tons)

	1949	1948
Mar.	14,550	24,282
Apr.	10,695	25,177
May	11,114	23,716
June	9,696	24,401
July	10,220	20,456
Aug.	14,194	24,098
Sept.	16,208	23,641
Oct.	18,036	21,559

Source: Ingot Brass and Bronze Industry.

Shipments of Castings

(Reported by Bureau of the Census)

Gray Iron

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	12,540,960	7,181,299	.....
1948			
July	914,464	490,359	2,601,084
Aug.	1,050,948	597,678	2,598,789
Sept.	1,088,051	615,978	2,587,385
9 mos. total	9,427,148	5,257,801	.....
Oct.	1,148,422	642,485	2,522,831
Nov.	1,099,827	606,380	2,406,737
Dec.	1,110,512	624,739	2,284,348
Total	12,785,909	7,131,405	.....
1949			
Jan.	1,040,343	573,164	2,064,861
Feb.	986,591	535,163	1,857,403
Mar.	1,074,704	567,041	1,639,465
Apr.	929,307	467,433	1,445,532
May	866,631	439,420	1,243,266
June	905,573	455,442	1,086,989
July	696,915	341,657	1,031,963
Aug.	872,013	445,981	1,048,308
Sept.	880,647	459,014	980,070
9 mos. total	8,252,724	4,284,315	.....

Steel

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	1,625,055	1,203,504	.....
1948			
July	120,445	87,927	497,410
Aug.	140,223	107,538	472,481
Sept.	149,222	112,551	447,972
9 mos. total	1,198,448	993,916	.....
Oct.	152,983	114,819	424,460
Nov.	146,835	110,275	395,013
Dec.	157,395	116,285	354,458
Total	1,760,032	1,335,295	.....
1949			
Jan.	140,577	103,503	338,889
Feb.	135,042	99,425	320,202
Mar.	138,889	102,027	284,754
Apr.	119,953	83,277	250,506
May	106,178	75,537	191,473
June	116,052	84,112	173,237
July	78,710	50,124	155,494
Aug.	89,964	59,412	143,566
Sept.	86,502	55,853	127,664
9 mos. total	1,011,867	713,270	.....

Malleable

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	895,054	513,228	.....
1948			
July	64,995	35,018	180,421
Aug.	73,272	41,201	176,824
Sept.	77,815	43,985	164,002
9 mos. total	694,428	395,269	.....
Oct.	81,761	44,305	158,351
Nov.	77,194	42,241	146,422
Dec.	79,882	43,397	137,385
Total	933,265	525,212	.....
1949			
Jan.	71,876	38,040	126,393
Feb.	66,744	35,074	118,318
Mar.	72,052	38,143	102,379
Apr.	61,329	31,728	94,958
May	54,572	27,643	78,944
June	59,597	32,639	69,865
July	44,360	23,216	70,796
Aug.	58,121	30,327	61,330
Sept.	60,488	30,646	57,512
9 mos. total	549,139	287,456	.....

Aluminum

(Thousands of pounds)

	Shipments Total	Sand	Perm. Mold	Die	Unfilled *Orders
1947					
Total	441,996	155,112	174,515	110,538	.....
1948					
July	28,944	9,851	10,504	8,005	70,321
Aug.	32,136	9,883	13,174	8,526	68,334
Sept.	35,877	11,822	13,353	10,218	66,773
9 mos. total	322,562	106,303	123,517	89,650	.....
Oct.	35,542	11,733	13,216	10,158	65,538
Nov.	34,550	11,410	13,012	9,640	63,767
Dec.	31,836	10,335	11,589	9,290	59,154
Total	424,490	139,781	161,334	118,738	.....
1949					
Jan.	29,142	9,702	10,386	8,490	55,580
Feb.	27,228	9,286	9,339	7,795	52,916
Mar.	27,478	9,348	9,386	7,999	50,508
Apr.	23,801	8,041	8,353	6,876	45,638
May	21,392	7,582	7,293	5,994	41,460
June	23,261	8,668	7,790	6,257	38,159
July	18,621	6,311	6,592	5,180	36,993
Aug.	23,997	9,048	8,326	6,119	38,130
Sept.	27,559	9,936	9,491	7,623	38,183
9 mos. total	222,479	77,922	76,956	62,333	.....

Magnesium

(Thousands of pounds)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	7,693	7,050	....
1948			
July	554	521	2,684
Aug.	703	655	2,834
Sept.	745	700	3,206
9 mos. total	6,024	5,460	....
Oct.	708	650	3,070
Nov.	728	683	3,416
Dec.	754	695	3,455
Total	8,214	7,488	....
1949			
Jan.	822	761	3,821
Feb.	813	756	3,586
Mar.	879	800	3,227
Apr.	726	669	3,234
May	778	726	2,885
June	799	759	3,025
July	689	637	3,073
Aug.	753	712	3,107
Sept.	727	691	3,015
9 mos. total	6,986	6,511	....

Copper-base Alloys

(Thousands of pounds)

	Shipments Total	Sand	Perm. Mold	Unfilled *Orders
1947				
Total	1,051,742	960,732	51,139	.....
1948				
July	71,803	64,389	4,670	66,014
Aug.	81,976	73,947	5,018	69,126
Sept.	86,973	78,830	4,999	66,574
9 mos. total	764,835	690,826	43,813	.....
Oct.	91,311	82,463	5,293	62,571
Nov.	86,497	77,751	5,107	60,892
Dec.	88,182	79,750	4,796	53,671
Total	1,030,825	930,790	59,009	.....
1949				
Jan.	76,348	68,379	4,593	48,124
Feb.	68,776	61,278	3,951	40,517
Mar.	70,173	62,557	3,927	37,646
Apr.	59,573	52,837	3,458	32,746
May	53,699	48,004	2,830	30,926
June	52,616	47,678	2,552	26,786
July	43,273	39,372	2,129	26,013
Aug.	58,055	53,203	2,929	26,071
Sept.	60,771	55,221	2,729	26,527
9 mos. total	541,378	486,623	29,098	.....

* For sale only.

Fast, Safe S
TRAMRAIL at M

A heavy centrifugal dryer casting being inspected by General Superintendent H. T. Hendricks and Heavy Floor Foreman L. L. Boone. This piece weighs 3620 lbs. Castings weighing from two oz. to 5300 lbs. are produced at McNally Pittsburgh.

McNally Pittsburg Foundries, Inc.

FOUNDERS OF PROCESS & ALLOY CAST IRON

Pittsburg, Kansas

Engineering Division
THE CLEVELAND CRANE & ENGINEERING CO.
Wickliffe
Ohio

Gentlemen:

We have your query about our present Cleveland Tramrail system. As you know, Tramrail was selected to service our three machine molding floors and the core department when this Foundry was built in 1945. Electric hoists are used.

The requirements were unusual. The machine floors handle a wide variety of work, calling for two to three types of metal during the day. Furthermore, the metal is scheduled on a semi-continuous basis, split into two separate heats. In addition, heavy flasks must be delivered to pouring conveyors and poured flasks must be delivered to the shakeout while the pouring cycle is proceeding.

This requires maximum flexibility in serving the floors with flasks, cores and metal; which was the determining factor in selecting Tramrail.

In our opinion, the experience over the past years has amply proven the success of your original recommendations. We feel that Tramrail is the most efficient and economical system for handling such a diversity of service demands.

Cordially,

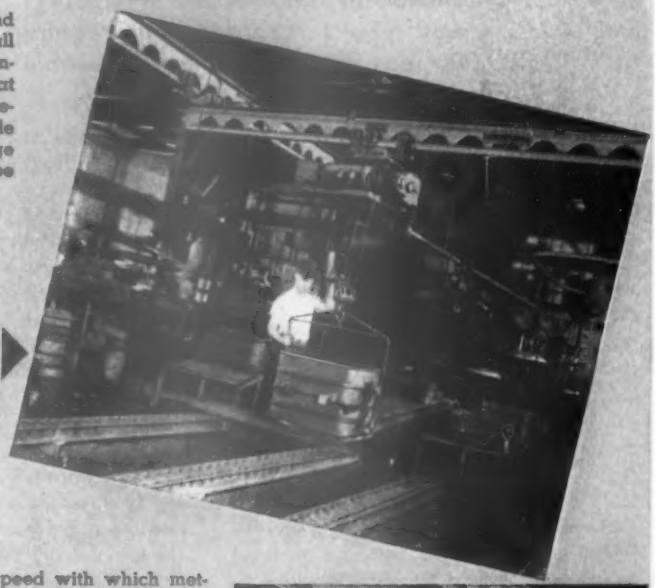
H. T. Hendricks
Superintendent

HTHendricks
trc

GENERAL OFFICES & FOUNDRY, PITTSBURG, KANSAS SUBSIDIARY OF THE McNALLY PITTSBURG MFG. CORP. PITTSBURG, KANSAS
SALES OFFICES CHICAGO, ILLINOIS, PITTSBURGH, PENNSYLVANIA, WELLSTON, OHIO
ALL CONTRACTS AND SHIPMENTS ARE SUBJECT TO STRIKES, FIRES, ACCIDENTS AND OTHER CAUSES BEYOND OUR CONTROL

Service PROVIDED BY CLEVELAND McNALLY PITTSBURG FOUNDRIES

The core room foreman and one core man can handle all cores with a Cleveland Tramrail bridge and hoist that travels the length of the core-making floor. Considerable time would be lost if the large volume of cores had to be hand-lifted.



Flasks are easily closed by use of the Tramrail equipment and moved to correct pouring conveyor with minimum lost motion.

The speed with which metal can be handled demonstrates the efficiency of Cleveland Tramrail equipment and the time that can be saved through its use. Ladles leave the cupola in order poured and go directly to pouring stations on three floors without waiting for other ladles.

Pouring the medium floor with an average of 11,000 lbs. per day, the Cleveland Tramrail equipment has proven fast, flexible and safe. This bridge is reserved for this ladle. An average of 139 molds are poured per day.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3626 E. 286TH ST., • *WICKLIFFE, OHIO*

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

By ARTHUR H. ALLEN
Detroit Editor
THE FOUNDRY

AROUND Detroit

All-out production of automobiles in prospect for first half of 1950. . . Last year's record output required approximately 2,300,000 tons of gray iron and malleable iron castings

ROUNDING out a year in which all production records for all time were soundly smashed despite a year-end loss estimated to run over 400,000 units, resulting from the steel and coal strikes, the automotive industry already is girding for a new push over the next three months, calculated to drive assembly rates even beyond the high level of last summer. The heat is now on foundry departments to build up castings banks to meet the projected demand from assembly lines later this month and next.

Final tally on 1949 is not yet complete, but estimates indicate a total for the U. S. and Canada of close to 6,500,000 cars and trucks. Of these about 1,220,000, or 18 per cent, were trucks. This is the smallest percentage registered by commercial units in the postwar period, comparing with 26 per cent in 1948 and 1947, and 30 per cent in 1946. Nevertheless it still far exceeds anything accomplished by truck producers prewar. Anyone who has done cross-country driving recently can attest to the inundation of highways with truck haulers, and the traffic problem they have created grows steadily more serious.

What this tremendous outpouring of motor vehicles means in terms of gray iron and malleable iron castings can be indicated by a few figures, although the totals are so astronomical they become difficult to comprehend. For instance, gray iron casting requirements for the year's passenger cars figure to 1,571,000 tons, for truck 422,000 tons; malleable iron for passenger cars 195,000 tons, for trucks 115,000 tons.

Impact of the steel strike was alleviated further by anticipatory buying of steel last July and August, and by the resumption of ingot conversion arrangements, which many plants pursued during the time steel was hard to get. General Motors, for example, plunked down several million dollars to buy approximately 300,000 tons of steel in excess of its requirements at the time, permitting operations to be continued in November and December which otherwise would have been suspended from lack of metal. At that, a spokesman for the corporation said the steel strike cost GM $400 million in business, which sounds a trifle exaggerated.

Many suppliers are perplexed over the intense pressure being brought to bear on production over the next three months which are normally rather dull sales periods. Advance indications are that the industry will break all previous quarterly output records, some companies talking of a 25 or 30 per cent boost from the peak schedule prevailing last September. It may be March before this is realized, but the effort will be made and it will involve overtime operations and six-day weeks in many departments.

There is some belief the industry is trying to push out every car and truck possible while present cost levels are in force. Higher steel prices by $3 or $4 a ton are now being talked freely, although mills are going slow in this direction. By March pension plans will be coming into effect—that is, the outlay of company funds for them—which is another added cost factor. The industry is doing its best to hold the price line, with a few reductions having been made—Oldsmobile on its 88 line and Pontiac on its station wagon. The reason is that price has become a much more important point in concluding sales, now that practically all models are readily available and the supply of good quality used cars is more nearly normal. This has meant that manufacturers are throwing additional sales emphasis on the lower-priced models of a single line, easing off on the super-deluxe job. Pontiac, for instance, expects to boost importantly the proportion of standard six models this year as against the more costly deluxe eights.

Every evidence points to a continuing good market for new cars. Some high industry sources feel they have far underestimated the number of potential buyers, and point to a recent Federal Reserve Board survey which seems to support this belief. Well over half the cars on the road are of prewar vintage, suggesting a continuing healthy replacement market. The number of new families in the U. S. market has jumped importantly since the war. Cars are being driven far more miles per day now than at any time in history. Two-car families have registered a rapid increase.

The possibility is seen that the industry plans to accelerate output to the limit for the first half of the year, then taper off in the summer for an early changeover to 1951 models. Sales charts on the 1950s should have major influence on the extent of changes which will be made in the next year's series. Certainly the revisions in 1950 models were nothing to grow particularly excited about. In fact, some of the publicity people had to scratch pretty hard to work up stories on the 1950 product which would be anything more than routine. If spring sales should fall below expectations, then look for some big changes in body styling and appointments.

Accent on Transmissions

So what, then, is the pitch for '50? All-out production for just as long as possible, but probably not much beyond July 1. Total production for the year may wind up 10-15 per cent below 1949. There will be a lot of accent thrown on automatic transmissions and a price battle between competing designs already is shaping up. Cadillac, Olds and Pontiac have trimmed the price on the Hydra-Matic by $25. Lincoln and Nash have made similar reductions on the Hydra-Matics they purchase from GM. Buick has cut its Dynaflow by $40 to bring it more into line with the Hydra-Matic.

In a few days, Chevrolet will release full details of its Powerglide automatic transmission which has been in production for several months at a Cleveland plant. Of the torque converter type, this unit could carry a price of less than $150, since that is the figure Ford has set as the maximum for its forthcoming Borg-Warner automatic gear shifter. By April, Studebaker will have another

FERRO-SILICON BRIQUETTES

Tepco Ferro-Silicon Briquettes, used mainly for the addition of silicon to the cupola charge of iron foundries, are most convenient because they contain a certain definite weight and can be counted instead of weighed. At the same time, the briquettes are more valuable than lump ferro-silicon because the binder in the briquettes protects the ferro-silicon as it is melted in the cupola and a greater return of silicon is obtained by that means.

Tepco Ferro-Silicon Briquettes are produced at our Chattanooga plant (formerly Southern Ferro-Alloys Company, Chattanooga, Tennessee). The 2½-pound briquettes contain one pound of silicon and the 5-pound briquettes contain two pounds of silicon.

Tepco Ferro-Silicon is also available in all sizes from lump through 150 mesh by down, packaged or in bulk—50%, 65% and 75% standard and low impurity grades. Special grades and sizes quoted on request.

PIG IRON

Diamond D Pig Iron—low-phosphorous, low-silicon, high-carbon, machine-cast—preferred for Nodular Graphitic Cast Iron and all White Iron Castings.

Rockwood Pig Iron—malleable and foundry, .15 to .30% phosphorous, machine cast, preferred for automotive, malleable and general castings.

FOUNDRY COKE

Radiant By-Product Foundry Coke—produced from properly blended coals to furnish high-grade foundry coke. Widely used by foundries in the Southern area.

Radiant Coke is also available in smaller sizes.

We will be glad to discuss with you, at any time, the numerous advantages of our plants and products.

TENNESSEE PRODUCTS & CHEMICAL CORPORATION

GENERAL OFFICES: NASHVILLE, TENNESSEE

PLANTS AT CHATTANOOGA, ROCKWOOD AND WRIGLEY, TENN.

Represented by

MILLER & CO., Chicago, St. Louis, Cincinnati; S. H. BELL CO., Pittsburgh; T. H. BENNERS & CO., Birmingham

EXPORT AGENTS: ORE & FERRO CORPORATION, 30 Broad St., New York

(*Concluded from page* 122)
type of Borg-Warner unit available on its Commander models, probably priced in the $150-$200 range. Packard is holding to the figure of $225 for its Ultramatic transmission.

Meanwhile, Dodge has been quietly lining up new batteries of several machine tools and other processing equipment at its main plant to expand production of automatic transmissions offered on Chrysler, Dodge and De Soto passenger cars, and possibly to produce a new design adaptable to Plymouth.

All of these transmissions involve either fluid couplings or torque converter elements, either of welded and brazed steel stampings or cast aluminum. If some ingenious foundry engineer could work out a system of casting these "orange-peel" units in gray iron, or possibly the new nodular iron, he might make a significant contribution to cost-saving in the manufacture of automatic transmissions. The casting would have to have exceptionally good finish on the blade elements and possess the requisite strength in thin sections. Actually, there are some grounds for belief that General Motors research metallurgists are working along these very lines, and a cast iron torque converter unit may not be as far away as it appears off-hand.

OBITUARY

CARTER S. COLE, 53, assistant technical secretary, American Society for Testing Materials, Philadelphia, died Nov. 17, in Philadelphia. A native of Culpeper, Va., he was graduated from University of Virginia in 1917. Following Navy service during World War I, Mr. Cole joined the motive power division of the Pennsylvania Railroad and in 1928 he was appointed to the engineering staff, Copper and Brass Research Association, New York. During the recent war he served as chief of the Metals Branch, Conservation Division, War Production Board. A member of ASTM since 1935, he joined its technical staff in 1944. As assistant technical secretary he contributed much to advance the society's research and standardization activities in the field of ferrous and nonferrous metals and in corrosion research, fatigue testing, etc. Mr. Cole was also a member of ASME, SAE, AIME and AFS.

* * *

Harry R. Donald, 67, since 1931 president, Interstate Supply & Equipment Co., Milwaukee, died there Nov. 15. A native of Milwaukee, he had been a distributor of foundry equipment there with his brother at Donald Sales & Mfg. Co., prior to organizing Interstate Supply & Equipment Co. in 1929. Mr. Donald was an organizer and a former director of Wisconsin Chapter of the AFS.

* * *

Edward F. McTighe, 72, founder and president, Industrial Brass Foundry, Maplewood, N. J., died Nov. 10, in Newark, N. J. Mr. McTighe, a native of Ireland, founded his brass foundry in Maplewood 25 years ago. Previously he had been manager of a foundry in Bridgeport, Conn.

* * *

Henry Rosenstein, 44, former foreman of the Indianapolis plant, National Malleable & Steel Castings Co., Cleveland, died Nov. 11 at his home there. Mr. Rosenstein, who was born in Indianapolis, had been associated with National Malleable for 25 years.

Hugo M. Marquette, 65, for the last 10 years manager of the Chicago district sales office, Grede Foundries Inc., Milwaukee, died there Nov. 28 following an illness of two weeks. Mr. Marquette, a native of Cedarburg, Wis., joined the company in 1937, following 25 years with the George H. Smith Steel Co., Milwaukee, predecessor of Smith Steel Foundry Co., which Grede Foundries acquired in 1942.

OSCAR W. SWANGREN

President, Dorchester Brass & Aluminum Foundry Inc., Hyde Park, Mass., whose death on Oct. 25 was reported in the December issue

Alvin G. Raddatz, 56, vice president, Lakeshore Machinery & Supply Co., Muskegon, Mich., died suddenly Nov. 2, in Cincinnati, while attending the convention of American Machine Tool Distributors Association. Mr. Raddatz, who founded and was former president of Lakeshore Machinery, was named vice president in 1933, following a merger of companies. He was a former director of the Western Michigan Chapter of the AFS.

* * *

Michael J. Horkan, 63, since 1913 a teacher of foundry courses at East Technical High School, Cleveland, and for many years in charge of its foundry, died there Dec. 12. Mr. Horkan, a native of Straid, County Mayo, Ireland, went to Cleveland in 1906. Following graduation from East Technical High School, he became a journeyman molder, and with a view to teaching foundry work in technical schools, studied at Western Reserve University and later obtained a teacher's certificate at Ohio State University. Mr. Horkan was a member of the Northeastern Ohio Chapter of the AFS.

* * *

Percy R. Jones, 63, eastern representative for the Ventilator Division of the Swartwout Co., Cleveland, died Nov. 7, at his home in Hollis, N. Y. Mr. Jones, a native of Toronto, Ont., came to the United States 40 years ago. He had been associated with the company for 25 years.

* * *

Arthur O. Minniear, 65, formerly foreman, Robert Holmes & Bros. Inc., Danville, Ill., died Oct. 29, at his home there following a two-year illness. Mr. Minniear, a native of Lafayette, Ind., went to Danville 48 years ago.

* * *

Cloud H. Brantner, 55, personnel director, Ohio Malleable Iron Co., Columbus, Ohio, died there Nov. 28, in White Cross Hospital. Mr. Brantner had been associated with the company for 38 years.

* * *

John A. Patterson, 67, Detroit district manager, Sterling Wheelbarrow Co., Milwaukee, died Nov. 12. A native of Cleveland, Mr. Patterson joined the company in 1922.

* * *

Edwin F. Leigh, 68, retired vice president-general manager, Marion Malleable Iron Works, Marion, Ind., died recently in Los Angeles.

* * *

Benjamin J. Letterman, 69, retired foreman, General Steel Castings Corp., Granite City, Ill., died there Oct. 18.

* * *

Virgile E. Bietry, president, B & S Bronze Foundry Inc., Brooklyn, N. Y., died Oct. 13.

THE FOUNDRY DATA SHEET JANUARY, 1950

Proposed Revised Tentative Methods of

PREPARATION OF MICROGRAPHS OF METALS AND ALLOYS

INCLUDING RECOMMENDED PRACTICE FOR PHOTOGRAPHY AS APPLIED TO METALLOGRAPHY

ASTM Designation: E2— -49T

(Continued from December)

(e) When oblique illumination from a single light source is used in connection with an etchant developing crystallographic etch pits, usually only a few grains will reflect light into the microscope in any given relative position of light source, specimen and microscope. In order to increase the number of reflecting grains, and yet produce sufficient contrast between any two neighboring ones to make the grain boundary visible, a special illuminating device may be used. This consists of three small projecting lamps, mounted so as to give oblique illumination from different directions. The lamps, each equipped with a different colored filter (usually red, green and blue) are fastened to a ring, whose axis of rotation intersects the specimen surface in the field of the microscope. Thus, the position of the lamps can be varied, while retaining the three beams of light focused on the field of the microscope. By moving the lamps, successively all grain boundaries can be located.

Filters for Photomicrography

11. Most photomicrographs are made through a color filter for one of the following three purposes:

(1) To control the contrast in colored objects.—This reason, which is the most important one in biological photomicrography, is usually only applicable in photography of whole objects, such as of copper or rusty iron, where a red filter will give more detail. The general rule is to use a filter of complementary color if maximum contrast of a colored object is desired against its background, but if maximum detail within the object is desired, use a filter transmitting the color of the object.

(2) To convert the quality of the white light to that demanded by the photographic material for correct rendition.—The filter required for this purpose will, of course, depend both on the quality of the illuminant being used and on the spectral sensitivity of the photographic plate or film, which should be of panchromatic sensitivity. The recommendation of the manufacturer of the plate or film should be followed in selecting this filter. The filter may be of three types, as follows:

(a) For black-and-white pictures, so-called orthochromatic filters will be required to make the neutral tones of the photograph of the same relative brightness as seen by the eye.

(b) Color photography[5] with a monopack (single exposure) material, such as the Kodachrome Films, Ektachrome Film, Agfacolor Film, etc., requires a specified quality (color temperature) of illumination. This illumination should originate from a homogenous incandescent source; a noncontinuous source or illumination from a lamp containing a mixture of radiating elements (such as mercury and tungsten) is not a reliable source for color photomicrography. Photometric filters will correct the quality of the illumination of an incandescent source to the specified color temperature when the latter is originally incorrect. If such photometric filters are bluish, such as the Wratten 81 or Wratten 81C, they raise the effective color temperature; if they are amber in color, such as the Wratten 84 or Wratten 84B, they lower the effective color temperature.

(c) It has been found that the optics of a commercial metallographic bench, including selective absorption or reflection in its components, degrade the spectral quality of the illumination from the lamp in such a manner that it is impossible to restore it to the original by alteration of the lamp current or use of a photometric filter. Good results with any three-color film can again be obtained, however, if the proper compensating filters are used to restore the effective color balance. Such compensating filters are easier to find when a series of subtractive and additive primary color filters are available for trial in series varying only in concentration. Gelatin film filters made for this general purpose are commercially available. Liquid filters of these specifications are also very practical and can be used in illumination beam when a carbon arc lamp is employed, which is an impractical procedure with the gelatin filters. The latter should be used in the image beam.

(3) To utilize that portion of the spectrum with which the objective gives its best performance.—Since uncolored specimens are the rule in metallography, this becomes the most frequent purpose, and is the reason that a green color filter is included with commercial metallographic outfits. Achromatic microscope objectives are in most frequent use. Such objectives are corrected under the assumption that monochromatic light is being used; although two such monochromatic images would coincide in focus, only a monochromatic image of yellow-green light would have the minimum optical defects. Therefore, the more nearly the filter corresponds to this, the more perfect the image. Even a rather wide green filter of correct maximum transmission markedly improves the results. The filter combination, Wratten B + G filters, or its spectral equivalent, should be used with achromatic objectives unless the narrow transmission involves too extended an exposure time, in which case a more open cut green filter may be used. Dyed gelatin filters, while the most accurately reproducible type, require the care of a

[5] Further details of color metallography can be found in a Symposium on Metallography in Color, Am. Soc. Testing Mats. (1949). (Symposium issued as separate publication, *STP* No. 85).

Proposed Revised Tentative Methods of

PREPARATION OF MICROGRAPHS OF METALS AND ALLOYS

INCLUDING RECOMMENDED PRACTICE FOR PHOTOGRAPHY AS APPLIED TO METALLOGRAPHY

ASTM Designation: E2— -49T

good lens, and particularly protection from excessive heat, such as afforded by a cell of water or acidulated copper sulfate solution. The illuminant should never be focused upon them. If a carbon arc is used, a solid glass filter of correct transmission is preferable. With semiapochromats or apochromatic objectives, use of wider portions of the spectrum, even white light, produces acceptable results, although (especially at high powers) the definition is still appreciably improved with monochromatic light. With such objectives, which have an aberration minimum in the blue as well as yellow-green, use may be made of the fact that the resolving power of the microscope is greater as the wavelength of the illumination decreases toward the blue-violet and a blue filter may be used.

Photographic Materials

12. (a) Photographic plates and films can be obtained in three types with regard to spectral sensitivity: (1) ordinary materials having the original ultraviolet through blue sensitivity of the silver salts, (2) orthochromatic materials whose sensitivity has been extended into the green by a sensitizing dye, and (3) panchromatic materials which have been made sensitive to the whole visible spectrum. There is considerable variation in the extent and the distribution of sensitivity within these types. Choice of the type merely depends upon the color of illumination being used; sensitivity of the plate to color that is not being used merely limits the allowable illumination in the darkroom. Consequently, orthochromatic plates are most generally useful in metallography. Unfortunately, the yellow-green usually used in metallography is so close to the red portion of the spectrum, to which the plate must be quite insensitive if it is to be used with red safe lights, that panchromatic plates will have a much lower filter factor to this illumination. However, some orthochromatic sensitizing dyes, with an unusually sharp long wavelength sensitizing terminus, have almost eliminated this advantage.

(b) Since contact prints are usually made from metallographic negatives, a plate or film should be selected whose primary grain size is such that the limit of its resolving power is adequately below that of the eye, so that none of the carefully obtained resolution of the optical image will be lost, but of no finer grain, such as is required for enlargement or process work, since this last is only obtained at the sacrifice of further photographic sensitivity and latitude without consequent gain. Whereas it is well to select a plate that can give rather high contrast with freedom from much fog (since fog is a most potent factor in reducing resolving power), the extremely high available contrast that is necessary in plates for process work is obtained at some sacrifice in latitude for the rendition of detail. Plates with the proper photographic balance for metallographic work are available on the market. Any photographic plate for photomicrography should possess an antihalation backing. An unbacked film is better in this respect than an unbacked plate, but not so good as a backed plate.

(c) Excellent results from any plate or film can only be obtained if it is correctly exposed. The resolving power of a plate, among other qualities, varies with the exposure. Since metallography is usually carried on in a laboratory and the specimens are fairly stable, a preliminary trial with step exposure times (each exposure double its predecessor in duration) should be made, including the standard development time, if there is any doubt concerning the correct exposure. Such exposure trials will only become necessary for a new type of specimen or illumination.

(d) A decision should be made before exposure, from experience or inspection of the image on the ground glass, whether it is desired to reproduce the image with the same contrast or to increase or decrease it in the negative, and if so, by how much. This control of the contrast is accomplished by choice of the plate or film, the choice of developer, and the extent of development. Only by developing at a specified temperature, with consistent agitation and to a specified time, can a desired degree of photographic contrast be obtained or maintained. No attempt to compensate for exposure should be made during development. That developer should be used that is recommended by the manufacturer of the plate or film. The proper time of development can also be obtained from this source. Development should, if possible, be done at 68° F. The plates should be rinsed in a solution of acetic acid (1.5 per cent) as a stop bath between development and fixation.

NOTE.—A more detailed discussion of photographic practice, as applied to photomicrography, may be obtained in the following publications:

1948 Metals Handbook, Am. Soc. Metals.

"Photomicrography," *Fourteenth Edition*, Eastman Kodak Co. (1944).

C. B. Neblett, "Photography, Its Principles and Practice," *Third Edition*, D. Van Nostrand Co., New York, N. Y. (1938).

Photographic Paper

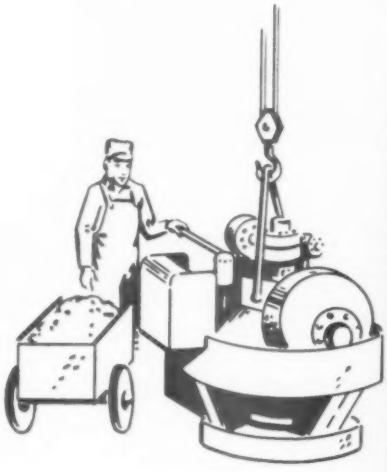
13. (a) The latitude or scale of tones in a photomicrograph is most frequently limited by the tone scale of the photographic paper, which is inherently less than that available in a transparency such as a negative. Since the scale of a soft paper, such as used for normal or somewhat contrasty negatives, is greater than that of paper made for too soft negatives, it is wise to develop the negatives so that printing on one of the softer papers,

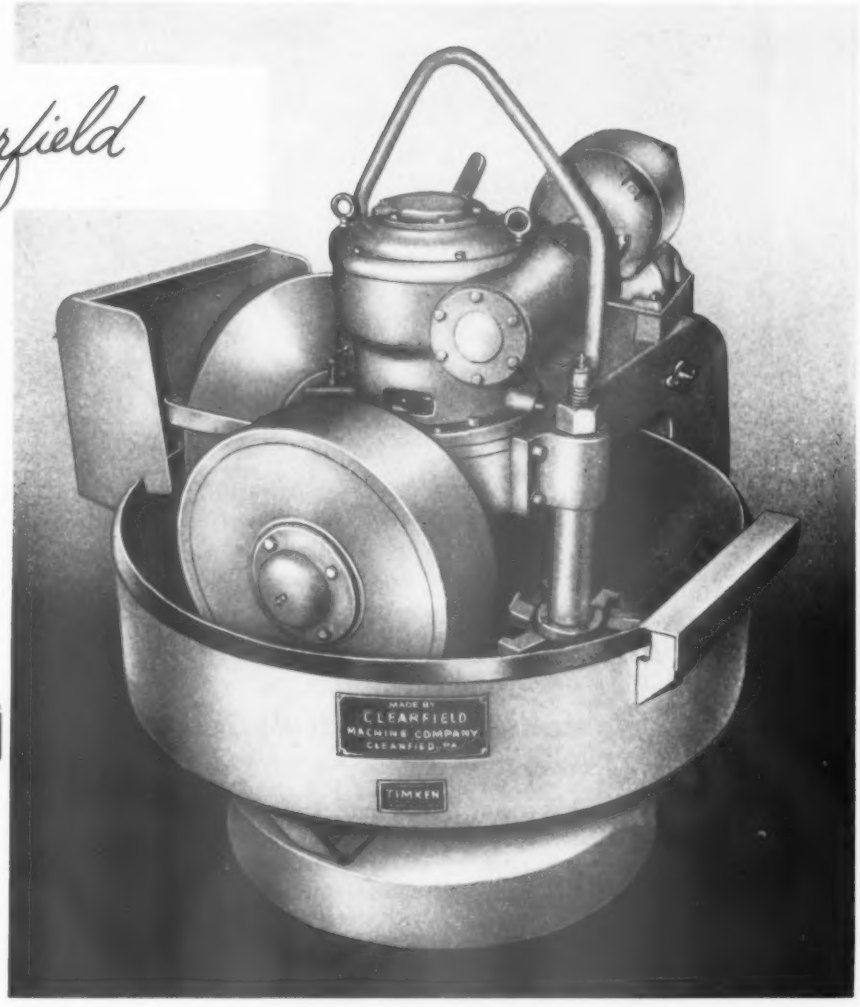
(To be concluded)

for *Portability*

THE *Clearfield*

No. 414





This 414 Clearfield Mixer has a wide field of use in either large or small plants in which the plan of sand preparation is built around the portability of the mixing unit. It may be suspended from a crane or monorail hoist and may be thus carried over the entire molding floor eliminating the need for conveying equipment. The machine is perfectly balanced and may be loaded, operated and discharged while suspended above the floor. Where crane facilities are not available for this purpose, the mixer may be equipped with roller bearing casters by means of which it may be moved anywhere over a level floor. The 414 delivers four cubic feet per batch.

CLEARFIELD
MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA, U. S. A.

THE FOUNDRY DATA SHEET JANUARY 1950

Jolt-Squeeze Molding Machines

Installed on Foundry's Second Floor

BY UTILIZING its second floor the Grinell Corp. recently solved the problem of providing additional molding capacity at its Cranston, R. I. foundry without resorting to new plant construction. Grinell, which manufactures pipe fitting, unit heaters, sprinkler systems and fire protection specialties, valves and jobbing castings, has been operating foundries since the 1880's and now has four foundries in this country and two in Canada. The Cranston foundry, built in 1908, has an ordinary 6-inch reinforced concrete second floor, with nearly 8000 square feet devoted to foundry operations.

Until two years ago, molding was conducted with power-squeeze, flask-lift machines located on the second floor. The company wanted to substitute jolt squeeze machines and also desired expanded capacity without the necessity of erecting a new plant.

A recommendation by the Tabor Mfg. Co., Philadelphia, that its shockless type jar machines could be placed safely on the second floor without danger of vibration or the necessity of providing new supporting pillars, was accepted by Grinell, and 24 units were installed. These are 13-inch jar-squeeze flask lift machines, operating with 13 x 16 inch flasks having 4, 5 or 6 inch cope and drag. Another battery of the same type machines later was added to a second line.

This shockless machine is a standard plain jar machine mounted on a heavy anvil which, in turn, is supported upon long helical steel springs. The table is raised by compressed air admitted into the cylinder by the automatic internal jarring valve, as in the plain jar machine. As this air acts equally on piston and cylinder, the anvil is forced down a proportionate amount. At a predetermined point in the rise of the table, the jarring valve reverses its movement, the air is exhausted from the jarring cylinder, and the table drops by gravity. Simultaneously, the anvil supporting springs, being relieved of considerable of their load, suddenly expand and give the anvil upward velocity to meet the falling table.

The force of the rising anvil is

(*Concluded on page* 131)

Above — One of two batteries of jar-squeeze machines operating on second floor of Grinnell Corp. foundry, Cranston, R. I., without damage to building which has no special floor support

Left—Closing mold at one of the molding stations

Improve Parting... Production... Profits

READ the NEW Acheson bulletin on How to Use **"dag"** colloidal graphite in the Foundry. **"dag"** colloidal graphite gives better parting, better reproduction, smoother surfaces . . . prevents damage to castings and molds.

It assures less labor per piece, improves pouring and saves on material, extends life of molds and saves on investment, cuts rejects and increases your production.

Even metallurgical quality is improved, because **"dag"** colloidal graphite adsorbs oxidizing gases. It is immune to foundry temperatures, economical to use and, when dispersed in water, eliminates smoking.

The NEW Bulletin #425 gives instructions on the coating of permanent molds, cores, patterns, gates, runners, risers, pins, shoulder screws, ladles, and other foundry equipment. We'll be glad to send it . . . please fill out the coupon.

Acheson Colloids is equipped to do custom disintegrating, dispersing, and stabilizing of solids in a wide variety of vehicles. The dispersing of colorants in resins and plasticizers is one of our specialties. If you are in need of this type of service, tell us about it. We may be able to help you.

ACHESON COLLOIDS CORPORATION
Port Huron, Michigan

☐ Send me the NEW Foundry Bulletin #425

☐ Send an Acheson engineer

NAME.....

COMPANY.....

STREET.....

CITY..... ZONE.....

STATE.....

A14

dag DISPERSIONS

Acheson Colloids Corporation, Port Huron, Michigan

... also Acheson Colloids Limited, London, England

To Maintain Fluidity of Casting Metal and for Solid Castings of Aluminum and Bronze

USE

SOFFEL'S THERMOTOMIC ABC

(Patented)

Exothermic Metal Feeding Compound

and

SOFFEL'S AL-X31

Carbon-Free Liquidizer

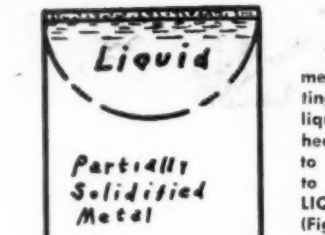
THERMOTOMIC ABC COMPOUND Thermotomic ABC is the first successful exothermic metal feeding compound to be developed for aluminum, bronze and magnesium castings. Results obtained from its use are amazing:

1. Feeding metal in heads or risers is maintained in the fluid state 20 to 30 minutes longer, ensuring the reservoir of feeding metal remaining molten until all sections of the casting have solidified.
2. Riser dimensions can be reduced to effect savings in feeding metal of 80% and more.
3. Chills can be eliminated.
4. Grain Structure is improved.
5. Tensile Strength and elongation is increased.
6. Removal of riser from casting is greatly facilitated because of restricted feeding neck.

Thermotomic is easy to use as it is complete in itself and requires only water for mixing. Thermotomic ABC Compound is molded into insert or ring cores and baked like ordinary sand cores. It is applied under feeding heads or risers and in other localized sections of the mold.

SOFFEL'S AL-X31 HEAD COMPOUND Best results and maximum feeding will be obtained from Thermotomic ABC when Soffel's AL-X31 Carbon-Free Liquidizer is used in conjunction with it. The liquidizer, when applied on the surface of the feeding metal in all heads and risers, enters into an exothermic reaction which serves to increase the temperature in the upper portion of the feeding metal while the Thermotomic Ring Core heats the lower portion of the feeding metal as shown in the diagram. The Carbon-Free Liquidizer also provides an insulating cover which prevents heat loss. It is also recommended for use independently to prolong the fluidity in the feeding heads or risers, and as a cover on pouring ladles to maintain temperatures.

HEAD TOO HIGH



To prevent freezing of feeding metal in center of head, thus shutting off atmospheric pressure to liquid metal (Fig. 1), Thermotomic heads should be restricted in height to equal their diameters in order to permit THERMOTOMIC and LIQUIDIZER heat curves to meet (Fig. 2). In this manner, ALL the feeding metal is maintained fluid while the casting is solidifying, thus assuring adequate feeding.

Shrink develops in this area where starved condition will occur when casting solidifies.

Fig. 1

HEAD CORRECT HEIGHT

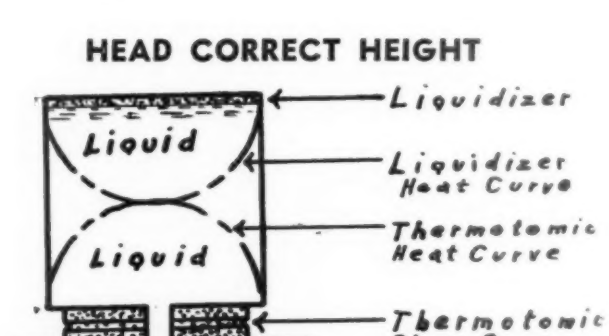


Fig. 2

Write for descriptive literature. We are the originators of Thermotomic Compounds and Carbon-Free Liquidizers—BEWARE OF IMITATIONS

Pittsburgh Metals Purifying Co.

World's Largest Producers of Quality Fluxes for all Metals and Alloys

1352 Marvista St., N. S. **Pittsburgh 12, Pa.**

(*Concluded from page* 128)
relatively equal to that of the falling table at the instant of impact and, as a result, a powerful ramming effect is exerted upon the sand without shock being transmitted to the foundation. Action is rapid since the head is required to travel only one-half of what ordinarily would be a full stroke, while the anvil is rising simultaneously the remainder of the distance.

FRENCH FOUNDRY ASSOCIATION

Holds Annual Meeting in Paris

By VINCENT DELPORT
European Manager
THE FOUNDRY

ANNUAL meeting of the French Association Technique de Fonderie has many of the characteristics of an international congress, although it is not officially so. This is probably due to the fact that Paris has retained its pre-eminent rank as the European center of culture, art and science, and that the French foundry industry maintains its prewar traditions of cordial hospitality. The favorable geographical location of Paris also is a factor.

In any event, the annual meeting held Oct. 10 to 12 attracted a large number of visitors from Belgium and Luxemburg, Czechoslovakia, Great Britain, Italy, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United States. By a lucky coincidence, the meeting was favored with the presence of William B. Wallis, immediate past president of the American Foundrymen's Society, who was a guest of honor at the banquet Oct. 11. Mr. Wallis conveyed greetings from the AFS and expressed his pleasure at being present among his colleagues from France and his faith in the beneficial effects of international technical cooperation.

At the opening meeting Oct. 10, Dr. Marcel Ballay, director of the Centre d'Information du Nickel, Paris, and president of the Association Technique de Fonderie, welcomed the foreign visitors and association members. The meeting was formally declared opened by M. Pierre Bellier, director of mechanical and electrical industries at the ministry of Commerce and Industry, and the first series of papers was presented at the ensuing technical session.

Visits were arranged for Oct. 12 to the foundries and research department of the Renault automobile plant; to the apprenticeship center of Suresne, near Paris; to the Societe Industrielle de Fonderie d'Aluminium, and the Fonderie de Precision de Nanterre. An opportunity also was given to inspect the extensions of the laboratories being organized for the Centre Technique de Fonderie at Bellevue, a few miles from Paris. These laboratories shortly will be capable of conducting almost any type of investigation of foundry problems as a service to the industry, and will include an experimental foundry.

This Foundry Technical Center, a complete description of wnich was presented in THE FOUNDRY, February, 1946, organizes works visits, consults with individual foundries on their problems at the rate of about 500 per month, and advises on foundry modernization and extensions. These services are decentralized through a number of offices with a permanent staff in principal French foundry centers. Under the stimulating leadership of its president, M. Ricard, and its general director, A Le Thomas, the Centre Technique is financed through small premiums from all foundries, based on individual plant production, and its services are available without further charge.

The 17 papers presented at the meeting's technical sessions were divided into four groups. The first was concerned with organization of work with a view of obtaining greater productivity and improved working conditions.

"Improvement in the Working Conditions in Foundries," by A. Cappon, of Delft, was the exchange paper from the Dutch Technical Foundry Association. The author stated that to place foundries on a proper social footing, it is essential not only that good sanitary conditions and an efficient apprenticeship organization should exist, but also that the daily atmosphere in which the men work should be as attractive as possible. Social progress and technical progress should be striven for together.

P. Rigaut, chief of studies for equipment and plant at the Centre Technique de Fonderie, gave a paper on "The Fight Against Bad Material Conditions in the Foundry," in which he insisted on the following points: Necessity of improving the upkeep of foundry shops through cleanliness and order, maintenance of painting in light colors, and proper lighting; improvement of sanitary conditions through ventilation and dust control, adequate heating and measures to reduce noise; the use of mechanical equipment to reduce fatigue; full use of measures to promote security against accidents; and adoption of measures to ensure greater hygiene and comfort for the workers.

In the title of his paper, Rene Goreaud, director of Compagnie d' Ingenieurs en Organisation, asked: "Is a Foundry, Particularly a Small Foundry, Capable of Using the Principles of Rational Organization of Work?" Answering this question in the affirmative, the author stresses that the main object is to increase speed of production while maintaining quality of the product and reducing the cost of production. The way to achieve this aim is to analyze all phases of production, break them up into their individual parts, and by a process of reorganization and separation or integration, to reduce the time taken in each process.

In the fourth paper of this group, R. C. Shepherd, general manager of the foundries of Ruston & Hornsby, Lincoln, England, dealt with "Some Trends in British General Engineering Iron Foundry Production Methods". This was the exchange paper from the Institute of British Foundrymen. The author indicated that the way to increase productivity in a large jobbing foundry is by working out a standard of work, and eliminating as many as possible of those factors that cause a departure from the accepted standard. It is necessary to resolve the processes of coremaking, molding and cleaning into elementary parts, study each individually and combine them into a synchronized whole that will be the standard for the particular pattern dealt with. The author then indicated principles according to which the different processes can be resolved and gave examples of layouts in each case.

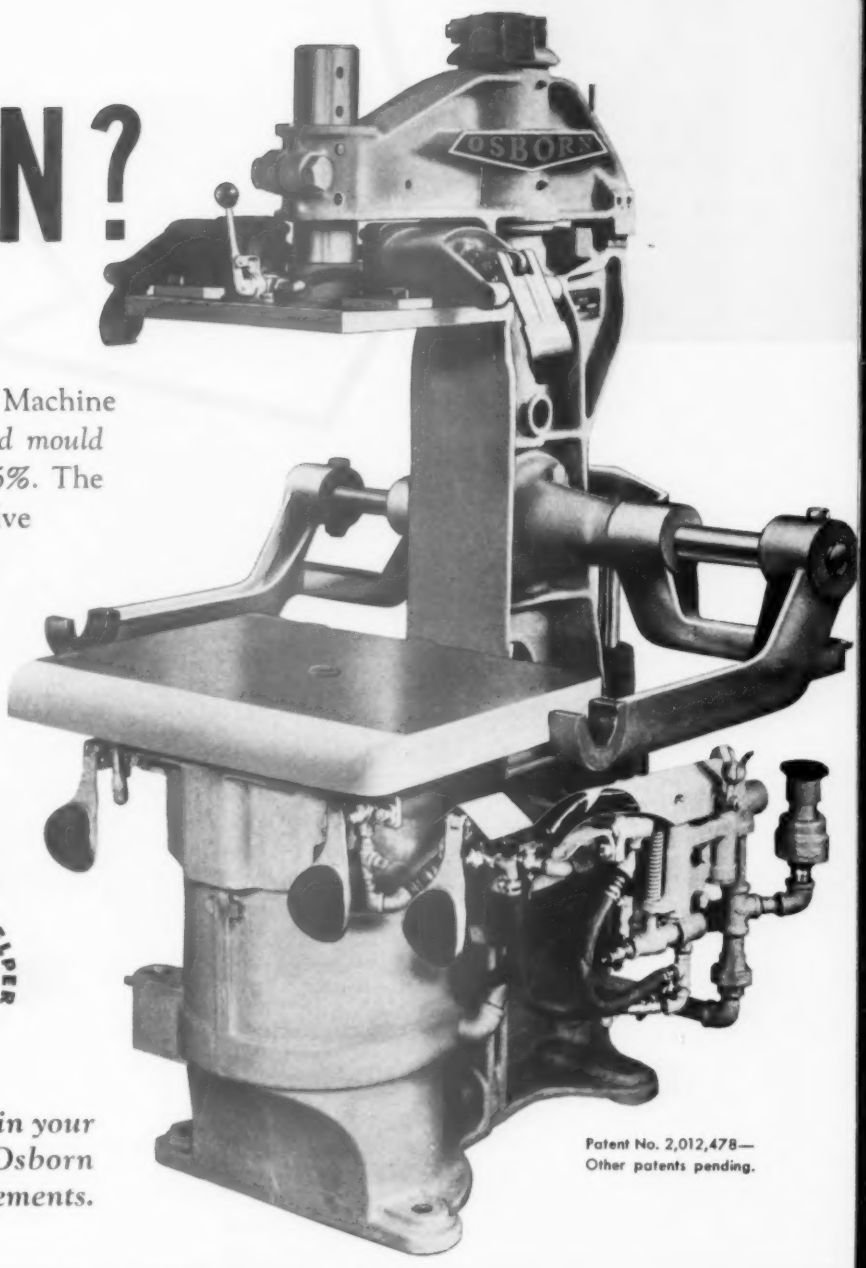
The second group of papers, discussed the afternoon of Oct. 10, dealt with metallurgy of cast iron.

(*Continued on page* 134)

HOW MUCH CAN THIS NEW ROTA-LIFT INCREASE YOUR

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Avenue Cleveland, Ohio

OSBORN PRODUCTION?



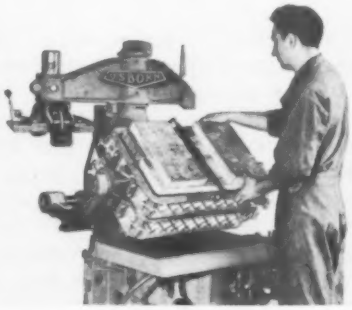
THE new Osborn ROTA-LIFT Moulding Machine installation shown has *already increased mould production* at this foundry by *more than 75%*. The ROTA-LIFT mechanically performs the five major operations in making moulds from large match plate patterns. In addition to conventional *jolting* and *squeezing*, it *rolls over, draws, and closes the mould* as shown in the pictures below. The new Osborn ROTA-LIFT conserves the physical energies of your moulders . . . makes your foundry a better place in which to work.

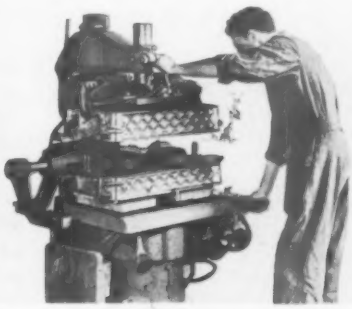
OSBORN
ROTA-LIFT

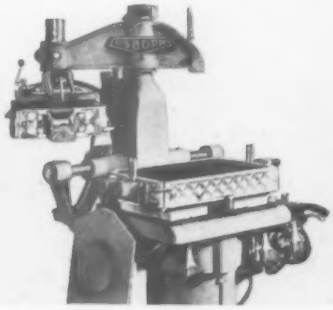
THE MOULDER'S HELPER

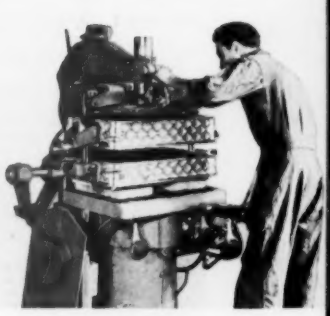
Similar savings are undoubtedly possible in your foundry, too. Request an experienced Osborn Foundry Engineer to analyze your requirements.

Patent No. 2,012,478—
Other patents pending.


Rolling Over


Drawing Cope


Handling Cope


Closing

OSBORN

MOULDING MACHINES CORE BLOWING MACHINES

MANUFACTURER'S ASSOCIATION INC. FOUNDRY EQUIPMENT

(*Continued from page* 131)

In a paper on "The Influence of the Rate of Charge of a Testing Machine on the Tensile Strength of Cast Iron," M. Gelain, the Centre Technique des Industries de la Fonderie, referred to tests made to find out if different rates of charge of the testing machine give notably different results for tensile strength. The iron was cast from an electric furnace, and the test pieces were machined from bars cast in green sand, and three sizes were selected: 20, 12.5 and 5.64 mm. Three rates of charging were selected: 0.8, 1.6 and 3.2 kg per sq mm. It was found that no significant effect on the tensile strength figure resulted from the variation of charging rate.

"Contribution to the Study of High Phosphorus Cast Irons" was the title of a paper by Jean Galey. The influence on cast iron of high phosphorus content was studied from the standpoints of structure, mechanical properties and corrosion resistance. The author's conclusions indicated that irons with high phosphorus content have mediocre mechanical properties. They are hard and fragile, but they can be of interest from the point of view of resistance to corrosion, especially as regards acids.

The exchange paper from the Association Technique de Fonderie de Belgique was by Armand Descy, in charge of the research department of Compagnie Generale des Conduites d'Eau, Liege. This paper, "Solidification and Structure of Cast Irons," is intended to show that certain phenomena, which are looked upon as abnormal, are actually frequent and normal, and that the fact they are considered exceptional is due to an incomplete interpretation of the Maurer diagram and to inaccuracies in this diagram. The author described a series of experiments in which certain pieces were cast under different conditions—in green sand, dried sand, and chilled mold—and he showed that the so-called abnormal results can be obtained methodically.

H. Gerbeaux, head of the technical department at Office Central de la Soudure, contributed a paper on "The Welding of Cast Iron for Mixed Assemblies." The author pointed out that already great strides have been made in the use of steel weldments, and he stated that cast iron parts can be used similarly. Tests have been made with gray iron castings and blackheart malleable castings, using arc welding. It was found that this method of welding caused the gray iron to crack near the joint, whereas the results with malleable iron were satisfactory. The author mentions that further experiments will be conducted with nodular pearlitic iron.

"The Analysis of Chromium in Metals and Ferrous Products" was the subject of a paper by Louis Roger, of the laboratories of the French National Railroads. The author dealt with the method of analysis of chromium by the use of perchloric acid, which is criticized by many chemists who claim that during the attack of the metal some chromium is dispersed as a volatile chloride of chromyle. The author claims that if the analysis is conducted correctly no such loss of chromium will occur. Rules to be followed are: Avoid the use of chlorhydric acid, heat gradually, stop the heating three minutes after oxidation has been obtained. Since chloride compositions always appear, evacuate them by ebullition during 10 minutes in 50 cu cm of water.

The last paper of this group, by L. F. C. Girardet, past president of the French association and founder at Saint-Die, was entitled "Electro-Chemical Attack Applied to Micrographic Control of Cast Iron and Measure of Corrosion Obtained in Each Case." The author stated that, in order to obtain rigorously comparable results in micrographic analysis, one should return to the electrical measurement of the chemical energy developed by the reagent employed, and he pointed out that the original discoverers of micrography had thought of this method but, surprisingly, did not pursue it.

The third group of papers, covering light alloys, began with a contribution by L. Grand, of the research department of Cie. Alais, Froges & Camargue. His subject was "The Grain in Foundry Alloys." He indicated that impurities, addition of other elements and nonmetallic inclusions will reduce grain size. Temperature and the rate of cooling also have a marked effect, the quicker the rate of cooling the smaller the size of the grain. The author reviewed various means of reducing grain size in practice, by the addition of special fluxes, and indicated the improvements obtained in a number of characteristics when grain size is reduced.

Effect of Oxidation

An interesting contribution was given by Paul Bastien, past president of the French association and professor at the Ecole Centrale des Arts et Manufactures, and Pierre Azou. The subject was "The Influence of Preliminary Oxidation on the Corrosion of Cast Iron Used for Melting Light Alloys with Liquid Silicon." Experiments first confirmed that preliminary oxidation of the iron had a very favorable influence. It was found that the period of oxidation must be rather prolonged on 32 per cent chromium iron, and that a protective coating of chromium oxide was then formed. On the other hand, a prolonged period of oxidation applied to other types of iron used for crucibles proved to be detrimental, but a short period of one to three hours is favorable.

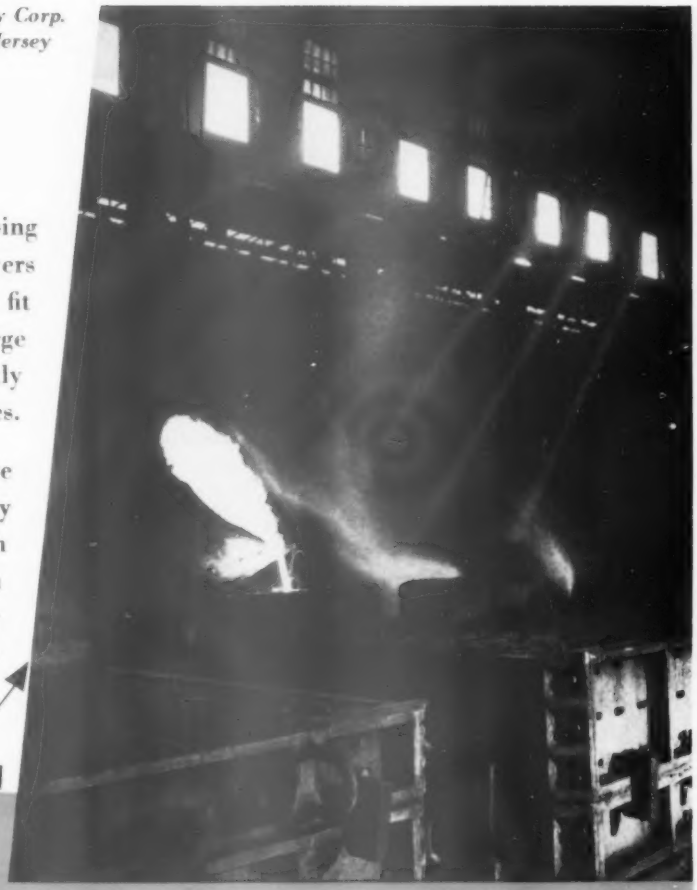
The exchange paper from the American Foundrymen's Society was by Walter Bonsack, director of the laboratory, Apex Smelting Co., Cleveland. The author explained that aluminum casting alloys have changed considerably in composition and utilization the last 25 years. The field of application has not only expanded at the cost of other metals and alloys, but new fields have been opened up in which other metals cannot compete because of the characteristics of aluminum.

New alloys have been developed more by gradual evolution and by studies of the effects of alloying elements on the metal and on existing

(*Concluded on page* 136)

Scene at opening of the Association Technique de Fonderie annual meeting. Left to right: Dr. Marcel Ballay, president of the association; Pierre Bellier, representing the ministry of Commerce and Industry; Rene Deprez, president of the Association Technique de Fonderie de Belgique and president of the International Committee of Foundry Technical Associations

Worthington Pump & Machinery Corp.
Harrison, New Jersey



★ This plant is the largest manufacturer of pumping machinery in the world. Its production of pumps covers every possible type, from the smallest that would fit into the palm of a hand, to large types with discharge openings of 6—7 feet. Built in 1904 and constantly modernized over the years, this plant covers 43 acres.

It is a good place to work because of this aggressive policy of constant improvement. It has continuously created employment not only through this plant, which is one of nine located in the U. S., but also through several European plants and offices scattered all over the world. It is noted for its good housekeeping policies. A complete, careful safety program is

This Foundry is A Good Place to Work

followed. All modern methods of reducing back-breaking drudgery are used. It is as clean and well-lighted a foundry as humanly possible.

Herman molding machines help make this a good place to work by their ease and simplicity of operation. One rotary valve handle controls the complete cycle. Hydraulic roll-over pattern draw results in smooth operation. Pressure lubrication is provided to each moving part... and, most important, our machines are used in this plant because *they've made their way by the way they're made.*

Herman MOLDING MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

(*Concluded from page* 134)

alloys.

James S. Vanick, International Nickel Co., New York, contributed a paper on "The Part Played by Nickel in Copper-Alloy Castings." For some years past American foundrymen have been adding 1 or 2 per cent nickel to their copper alloys, thus obtaining improved properties. Recent investigations have shown that with additions of from 3 to 10 per cent nickel, several interesting groups of alloys have been evolved. Some constructional bronzes containing 5 per cent nickel and 5 per cent zinc have given tensile strengths ranging from 45,500 to 89,000 psi. Alloys have been developed for pressure castings containing 5 per cent each of nickel, tin, lead and zinc. Other alloys for bearings have 5 per cent nickel, 5 per cent tin and lead up to 2 per cent. A new alloy for bearings contains 10 per cent lead, 1 per cent antimony and 8 per cent nickel. Another alloy with 30 per cent nickel is particularly corrosion resistant.

A paper describing "Peculiarities about Dies for Gravity Casting of Aluminum" was contributed by Pierre Fouron and Rene Bourret, of Societe d'Etudes de Materiel de Fonerie. The authors give the five following rules:

1. Cut down as much as possible the number of elements in which the dies must be separated to ensure liberation of the casting.

2. Closely study the shape of various parts of the dies with a view to reducing the deformations arising from variations of temperature in the dies.

3. Owing to the brittleness of the alloys during solidification, it is necessary to foresee the rapid disassembling of the mobile parts of the dies, which impede the contraction of the casting, and this should be possible without hammering.

4. Numerous outlets for air and gases should be provided and should be placed at the upper part of the dies.

5. The movable parts should be securely locked.

The fourth and last group of papers dealt with apprenticeship, an important subject to French foundrymen. Henry Dubois, technical director, Etablissements Brisou, at Servon-sur-Vilaine, and Edgar Lecoeuvre, chief engineer at the national establishment of Indret, contributed a paper on "The Formation of Foundry Foremen and Managers With a View to the Correct Planning of Work in an Engineering Foundry." These leaders, it was stated, should be recruited from practical industrial schools and should be well versed in the time study of the parts to be made.

The exchange paper from the Czech Technical Foundry Association was by Adolphe Plesinger, Prague, who developed principles previously stated in earlier contributions on "Professional Formation in Czech Foundry Industry." This covers the training of men from apprentices to foremen and engineers. D. Waeles, first vice president of the Association Technique de Fonderie, gave a paper, illustrated by a film, showing the progress made in France in the professional training of foundrymen.

FRENCH FOUNDRYMEN: Members of the team of French gray iron foundrymen who recently visited American foundries in a tour sponsored by the Economic Cooperation Administration are shown here at the plant of the Osborn Mfg. Co., Cleveland. A day-long program presented by the company included demonstrations of its molding and core blowing machines as well as motion pictures and slides describing typical foundry installations. The program was directed by Leon F. Miller, sales manager, and George E. Miller, assistant sales manager, Osborn's Machine Division

Book Review

Gates and Risers for Castings. Third Edition, by Pat Dwyer, cloth, 375 pages, 6¼ x 9¼ in., published by the Penton Publishing Co., Cleveland. Price $6.

The author, who is engineering editor of THE FOUNDRY and probably is one of the best known men of the industry, utilized his years of experience as an apprentice, journeyman molder, foundry superintendent and editor in the preparation of this work, which originally was presented as a series of articles in THE FOUNDRY. In preparing the material, Mr. Dwyer drew freely upon data published in this and other publications so that the text represents a compilation of much of the available information on the subject.

The third edition contains new material on sleeves and pads, knockoff risers, pouring through risers, permanent molds for aluminum, formulas for centrifugal pouring speeds, magnesium casting systems, vacuum systems, blind risers, risers under pressure, thermotomic feeding, developments in gating malleable iron, and precision casting principles. All material in the previous edition is included.

Mr. Dwyer has compiled this book from the standpoint of the practical foundryman. The material is arranged so that it will be of assistance to the man in the shop in solving the day-to-day problems of gating and risering. The work is divided into sections covering gray iron, brass and bronze, aluminum, steel and malleable iron. The author has included 247 illustrations, and has provided an extensive index.

Products for the Iron and Steel Industries

PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
ALSIFER	Aluminum.....20% Silicon.....40% Iron.....40%	Used principally as a steel deoxidizer and for grain size control.
FERRO CHROMIUM High Carbon Grade	Chromium....66-70% Carbon.....4-6%	For wrought constructional steels and steel and iron castings.
Iron Foundry Grade	Chromium....62-66% Carbon.....4-6% Silicon.....6-9%	For alloyed cast irons. Readily soluble as a ladle addition at the lower temperatures of cast iron.
Low Carbon Grades	Chromium....67-72% Carbon...06%, .10%, .15%, .20%, .50%, 1.00% and 2.00% max.	For low carbon chromium steels, especially those with high chromium content, such as stainless and heat-resistant types.
FERRO SILICON 25-30% Grade	Silicon.....25-30%	Deoxidizer for open hearth steels; also for high silicon, corrosion-resistant iron castings.
50% Grade	Silicon.....47-52%	Used as a deoxidizer and for the addition of silicon to high silicon steels, for springs, electrical sheets, etc. Pulverized form used as ladle addition to cast irons for silicon content and graphitization control.
75% Grade	Silicon.....74-79%	For high content silicon steels, such as spring steels, sheets and forgings of high magnetic qualities for electrical apparatus.
High Silicon Grades 80-85% 85-90% 90-95%	 Silicon.....80-84.9% Silicon.....85-89.9% Silicon.....90-95%	 For high content silicon steels where small ladle additions are used for required silicon content. Also for manufacture of hydrogen by reaction with caustic soda and production of magnesium by the Pidgeon process.
FERRO TITANIUM High Carbon Grade	Titanium.....15-18% Carbon.....6-8%	Final ladle addition to control "rimming" action and to clean effervescing steel. Final deoxidizer and scavenger for steel castings and fully killed ingot steels.
Medium Carbon Grade	Titanium.....17-21% Carbon.....3-4.50%	Often preferred to the High Carbon Grade as a final ladle addition to very low carbon rimming or effervescing steels.
Low Carbon Grades 20-25% Ti Grade	Titanium.....20-25% Carbon...max. 0.10% Silicon.....max. 4% Aluminum max. 3.50%	Carbide stabilizer in high chromium corrosion-resistant steels of extremely low aluminum content. Deoxidizer for some casting and forging steels.
40% Ti Grade	Titanium.....38-43% Carbon...max. 0.10% Silicon.....max. 4% Aluminum...max. 8%	Carbide stabilizer in high chromium corrosion-resistant steels, where smaller ladle additions are desired and extremely low aluminum content is not essential.
ALUMINUM	Aluminum ... 85-99%	For deoxidation and grain size control of steel. (Ingot, shot, grain and special shapes.)
VANADIUM METAL 90% Grade 95% Grade 99.7% Grade	 Vanadium ..... 91% Vanadium ..... 95% Vanadium 99.7%	For iron-free, low-iron, or low-impurity alloys.

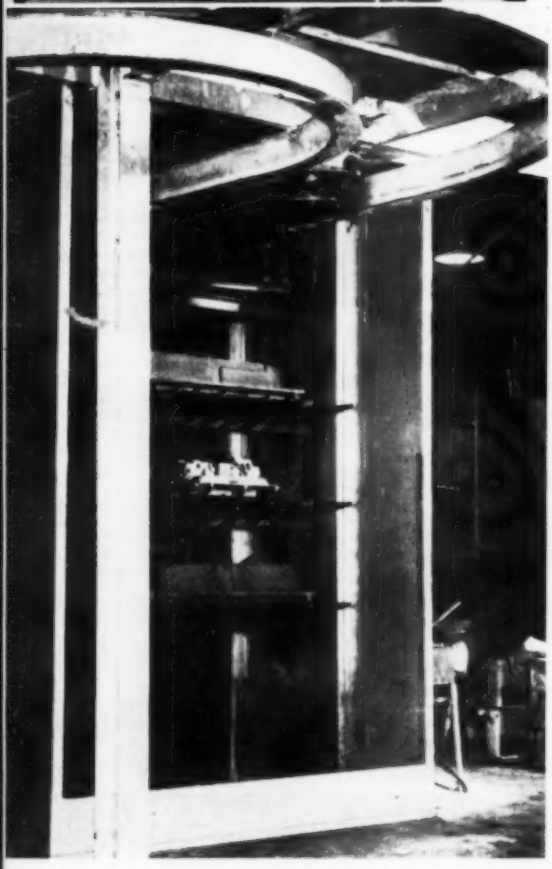
PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
FERRO VANADIUM Iron Foundry Grade	Vanadium....38-42% Silicon.....7-11% Carbon.....about 1%	For iron foundry use. Imparts remarkable improvement in physical properties with no sacrifice of machinability; highly soluble, insuring complete diffusion.
Grade "A" (Open Hearth)	Vanadium....35-45% 50-55% Silicon...max. 7.50% Carbon...max. 3.00%	For low percentage vanadium content of rolled, forged or cast constructional steels. Also used in vanadium cast irons.
Grade "B" (Crucible)	Vanadium....35-45% 50-55% Silicon...max. 3.50% Carbon...max. 0.50%	For tool steels and special high vanadium steels in which required limits for carbon and silicon are narrow.
Grade "C" (Primos)	Vanadium....35-45% 50-55% 70-80% Silicon...max. 1.25% Carbon...max. 0.20%	For tool steels and special steels requiring high percentages of vanadium and exceptionally low carbon and silicon content.
VANADIUM PENTOXIDE Technical Grade Fused Form	V_2O_5..88-92%	A source of vanadium in basic electric furnace steels. A base for numerous chemical compounds.
Technical Grade Air Dried Form	V_2O_5.....83-85%	A base for preparation of numerous chemical compounds (catalysts, etc.).
GRAINAL ALLOYS Vanadium Grainal No. 1	Vanadium....25.00% Aluminum....10.00% Titanium.....15.00% Boron.....0.20%	Practical and economical intensifiers for controlling and increasing the capacity of steels to harden, and for improving other important engineering and physical properties.
Vanadium Grainal No. 6	Vanadium....13.00% Aluminum....12.00% Titanium.....20.00% Boron.....0.20%	See above.
Grainal No. 79	Aluminum....13.00% Titanium.....20.00% Zirconium.....4.00% Manganese....8.00% Boron.....0.50% Silicon.....5.00%	See above.
GRAPHIDOX No. 4	Silicon .....48-52% Titanium.....9-11% Calcium 5-7%	For graphitization of iron; ladle treatment insures normal graphite, free from dentritic structure; reduces chill; efficient inoculant in production of high strength irons.
V-FOUNDRY ALLOYS V-5 Grade	Chromium....38-42% Silicon.....17-19% Manganese....8-11%	Used in cast irons as a ladle addition. Reduces chill, promotes uniformity of structure, increases strength and hardness.
V-7 Grade	Chromium....28-32% Silicon.....15-21% Manganese...14-16%	See above.
BRIQUETTES Ferro Chromium	Hexagonal. Weigh approx. 3⅜ lb. and contain 2 lb. of chromium.	A practical and convenient form for adding ferro-alloys to the cupola.
Ferro Silicon	Two sizes, both cylindrical, one containing 1 lb. of silicon; the other, 2 lb. of silicon.	See above.
MISCELLANEOUS	Special ferro-alloys, metals, chemicals and carbides.	To meet individual requirements.

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

CORE HANDLING SIMPLIFIED

In Modernized Foundry



WHEN the Oliver Corp. modernized its Charles City, Iowa, tractor foundry a few years ago, it realized three objectives: First, production of castings was increased 50 per cent; second, production costs were reduced substantially and third, cost of maintenance was lowered 25 per cent. Modernization in the coreroom, incorporating new baking facilities and an unusual type of corehandling equipment, resulted in a marked improvement in quality of cores as well as lower production costs.

The foundry produces gray iron transmission cases, front frames and motor blocks for Oliver tractors. Daily capacities in the coreroom are 30 large cores and 80 medium size cores per hour. Ovens operate 16 hours per day, and daily requirements of core sand are 40 tons.

Improved coreroom facilities include two convection-heated, conveyor type core baking ovens complete with high-velocity air seal curtains and insulated cooling chambers. Cores being processed in the larger of the two ovens pass through two heat zones, with capacities of 3 million and 1 million Btu, respectively. They are cooled by passing through a 60-ft long insulated cooling chamber equipped with a 20,000 cfm exhaust fan for the removal of fumes. Cool air is taken from the outside by means of a similar type fan and forced into ducts arranged in the cooling chamber.

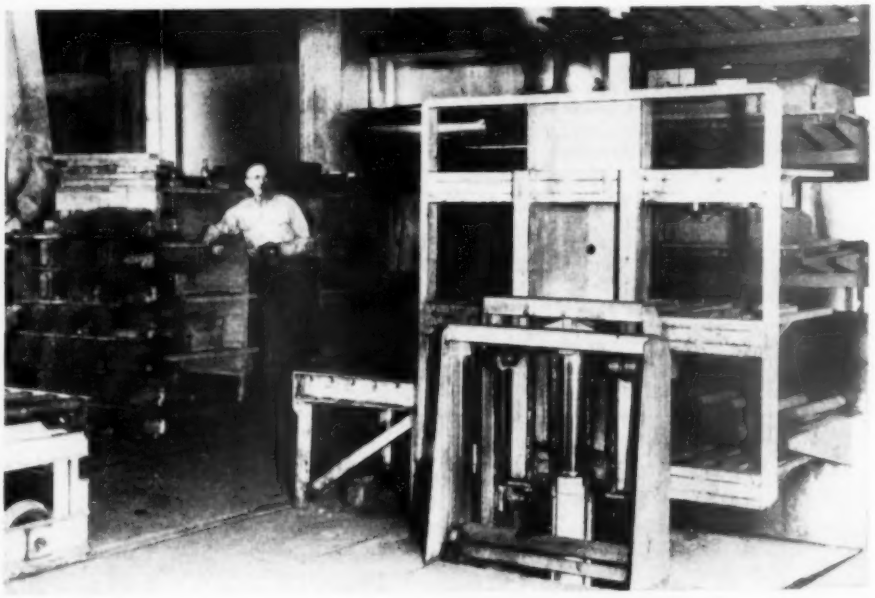
Core baking in the smaller oven is also zoned with the heating capacity for zone one rated at 1½ million Btu and for zone two at 1 million. As in the case of the larger oven cores pass through a similar cooling chamber 50 ft long with a

(*Concluded on page* 140)

Top left—Hydraulic loader (arrow) has just been lowered following loading of cores on conveyor rack shown entering the oven

Left—A loaded rack emerges from oven cooling chamber on way to unloader

Below—As the conveyor rack is brought into position, fins of the unloader pass between the leaves of the rack, lifting cores off the rack. This process is reversed when the racks are loaded



FOR ENDURANCE AND LONG LIFE BUY SPO MOLDING MACHINES

SPO No. 507 Jolt Rockover Draw Machine

Thanks to SPO's INVERTED JOLT FEATURE..

You can't beat the No. 500 *Series* for the making of Drag Molds!

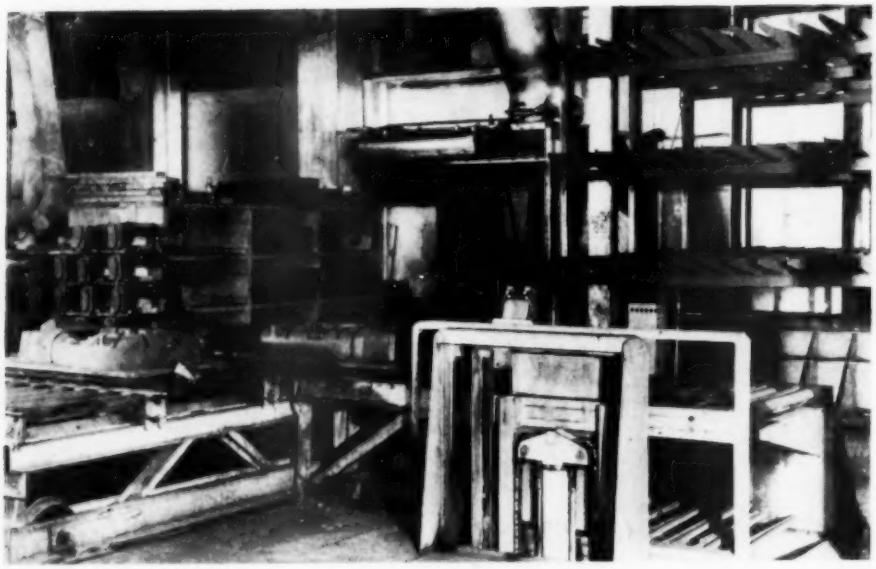
For the sake of the old profit column, see whether the proper member of SPO No. 500 Series does not add its usual big contribution in your case, too. *SPO's exclusive inverted jolt feature is the difference.* Modern, perfected, proven, this real advance regularly delivers more sound drag molds and cores than ever before at a uniformly low cost. The production is there—so is the accuracy. So is the long, trouble-free service that makes your investment look good over the term.

Always find out first what SPO has to offer.

SPO INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE • • CLEVELAND 5, OHIO



Unloader lowers cores to the roller table and transfers them to the transfer table at extreme left. Latter is moved into position on its own track laid on the foundry floor

(*Concluded from page* 138)

20-ft insulated section.

The air seal curtains located at each end of the ovens provide effective heat seals. Air distribution and circulation within the oven work chambers is kept at maximum uniformity with the aid of adjustable louvered port openings in the duct work.

An interesting materials handling feature of the Oliver foundry is the hydraulic core loader and unloader used to transfer cores to and from the conveyor racks. This is said to be the first installation of this system of core handling.

The operation is comparatively simple, as indicated by the accompanying illustrations. As each core conveyor rack is moved into position the loader lifts and deposits three separate loads onto the three levels of the rack. Unloading is performed in a similar way at the end of the cooling zones. Loads are rolled up to the loader and away from the unloader by means of special roller tables.

Previously all cores were handled by a crane and loaded onto cars which were then pushed into the ovens. Under the new method cores are not handled until the assembly operation and the flow of cores from coremaker, through the baking ovens and to the molder is one smooth, continuous operation.

The Despatch Oven Co., Minneapolis, designed and fabricated the baking ovens and cooling chambers and collaborated with Oliver engineers in making the complete foundry installations.

Meetings of Interest to Foundrymen

Jan. 16-19—Plant Maintenance Show and Conference, Public Auditorium, Cleveland

Jan. 20 — Malleable Founders' Society, semiannual meeting, Hotel Cleveland, Cleveland

Feb. 9-10—Wisconsin Foundry Conference, Schroeder Hotel, Milwaukee

Feb. 9-10—Birmingham Regional Foundry Conference, sponsored by Birmingham AFS chapter

Feb. 24—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Feb. 27-Mar. 3—American Society for Testing Materials annual committee week, William Penn Hotel, Pittsburgh

Mar. 3—Malleable Founders' Society, eastern sectional meeting, Commodore Hotel, New York

Mar. 10-11 — Ohio Regional Conference, Cincinnati, sponsored by Ohio AFS Chapters and University of Cincinnati.

Mar. 21-22—Steel Founders' Society of America, annual meeting, Edgewater Beach Hotel, Chicago

Mar. 24—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Apr. 4-8—Chicago Technical Societies Council, national production exposition, Stevens Hotel, Chicago

Apr. 28—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

May 8-12—American Foundrymen's Society, annual convention and exhibition, Cleveland

May 19—Malleable Founders' Society, eastern sectional meeting, Commodore Hotel, New York

May 26—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

June 1-3—Electric Metal Makers Guild, annual meeting, Shawnee Hotel, Springfield, O.

June 22-23—Malleable Founders' Society, annual meeting, The Homestead, Hot Springs, Va.

June 26-30—American Society for Testing Materials, annual meeting and exhibition, Haddon Hall, Atlantic City, N. J.

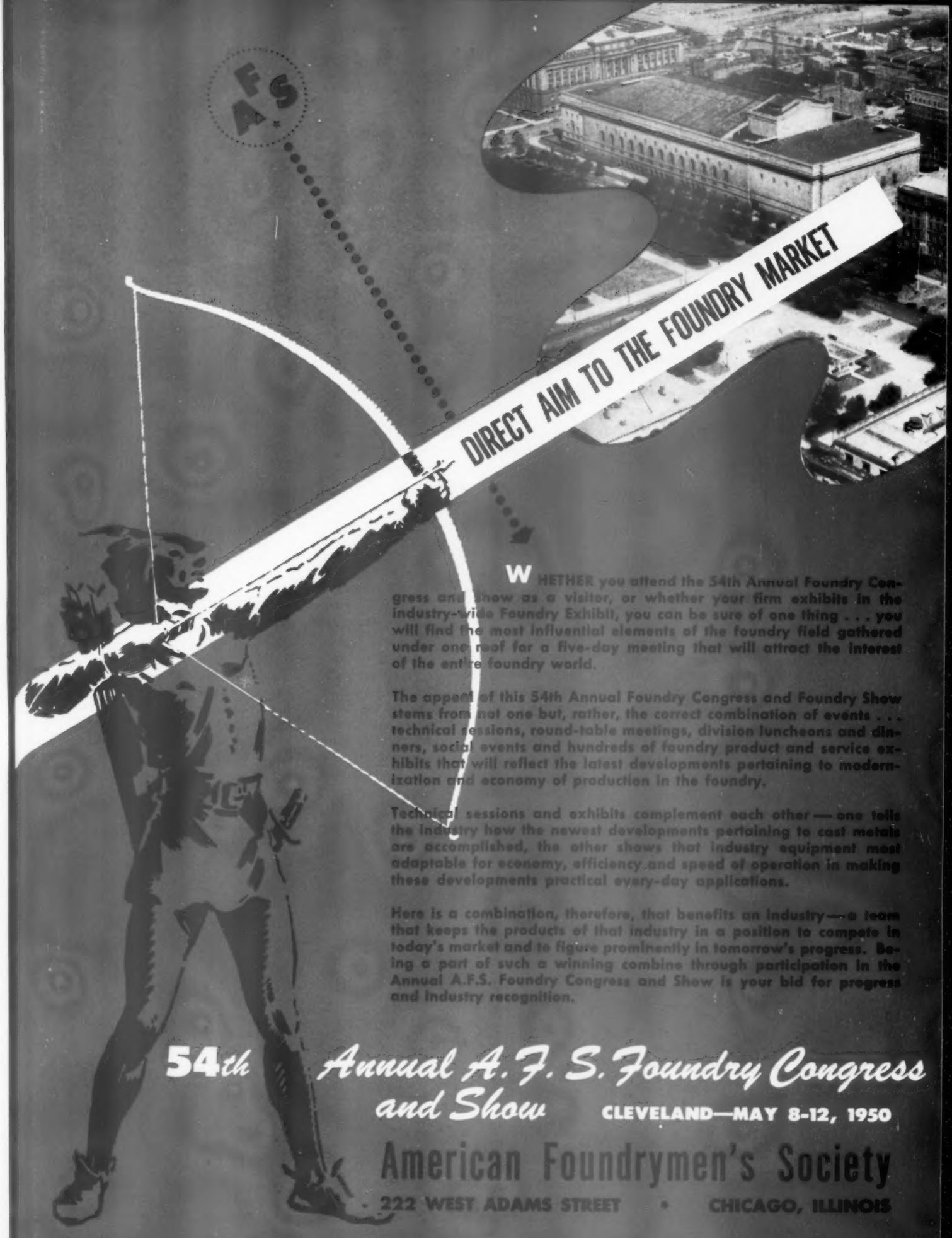
July 28—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Oct. 12-14—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

Oct. 19-20—Gray Iron Founders' Society, annual meeting, Netherland Plaza Hotel, Cincinnati

Oct. 23-27—American Society for Metals, congress and exposition, Chicago

Nov. 8-10 — National Foundry Association, annual meeting, Edgewater Beach Hotel, Chicago



WHETHER you attend the 54th Annual Foundry Congress and Show as a visitor, or whether your firm exhibits in the industry-wide Foundry Exhibit, you can be sure of one thing . . . you will find the most influential elements of the foundry field gathered under one roof for a five-day meeting that will attract the interest of the entire foundry world.

The appeal of this 54th Annual Foundry Congress and Foundry Show stems from not one but, rather, the correct combination of events . . . technical sessions, round-table meetings, division luncheons and dinners, social events and hundreds of foundry product and service exhibits that will reflect the latest developments pertaining to modernization and economy of production in the foundry.

Technical sessions and exhibits complement each other — one tells the industry how the newest developments pertaining to cast metals are accomplished, the other shows that industry equipment most adaptable for economy, efficiency and speed of operation in making these developments practical every-day applications.

Here is a combination, therefore, that benefits an industry — a team that keeps the products of that industry in a position to compete in today's market and to figure prominently in tomorrow's progress. Being a part of such a winning combine through participation in the Annual A.F.S. Foundry Congress and Show is your bid for progress and industry recognition.

54th *Annual A. F. S. Foundry Congress and Show*

CLEVELAND—MAY 8-12, 1950

American Foundrymen's Society

222 WEST ADAMS STREET • CHICAGO, ILLINOIS

PURDUE CASTING CONFERENCE

Stresses Process Control

By FRANK G. STEINEBACH
Editor
THE FOUNDRY

THE second annual Metals Casting Conference, held at Purdue University, West Lafayette, Ind., Nov. 3-4, under the joint auspices of the university and the Michiana and Central Indiana Chapters of the American Foundrymen's Society, was attended by approximately 250 foundrymen, members of the university instructional corps and undergraduate students. The conference was arranged by a joint committee headed by Prof. C. T. Marek, Department of General Engineering, Purdue University, and with Paul H. Harlan, vice president, Electric Steel Casting Co., Speedway, Ind., as program chairman. Theme of the conference was "Improving Products and Effecting Economies through Process Control."

The first session was opened by Prof. H. A. Bolz, head, department of General Engineering, who reported that the conference held last year had proved exceedingly beneficial to many members of the university staff. Professor Bolz stated that the university had for its objectives the training of citizens, developing new knowledge, and providing those public services possible through the university setup. The foundry conference provides a service function on the part of the university. In closing, Professor Bolz pointed to the fact that Purdue is the largest engineering school in the world and that foundry practice has been taught there for 70 years.

Dr. A. A. Potter, dean of engineering, in welcoming the foundrymen to the university, stressed the public service features of the institution. Since engineering is an art as well as a science, all engineering students have one semester in engineering processes, and one-third of the time is devoted to foundry work. During the school year of 1948-49, he estimated that 2900 students will receive instruction in the foundry.

Dean Potter stated that Purdue was greatly interested in the foundry industry because it is bound to be of greatest importance in the industrial world. He paid tribute to the work of the Foundry Educational Foundation and the help that has been given by George K. Dreher in furthering the expanded FEF program that will include Purdue University.

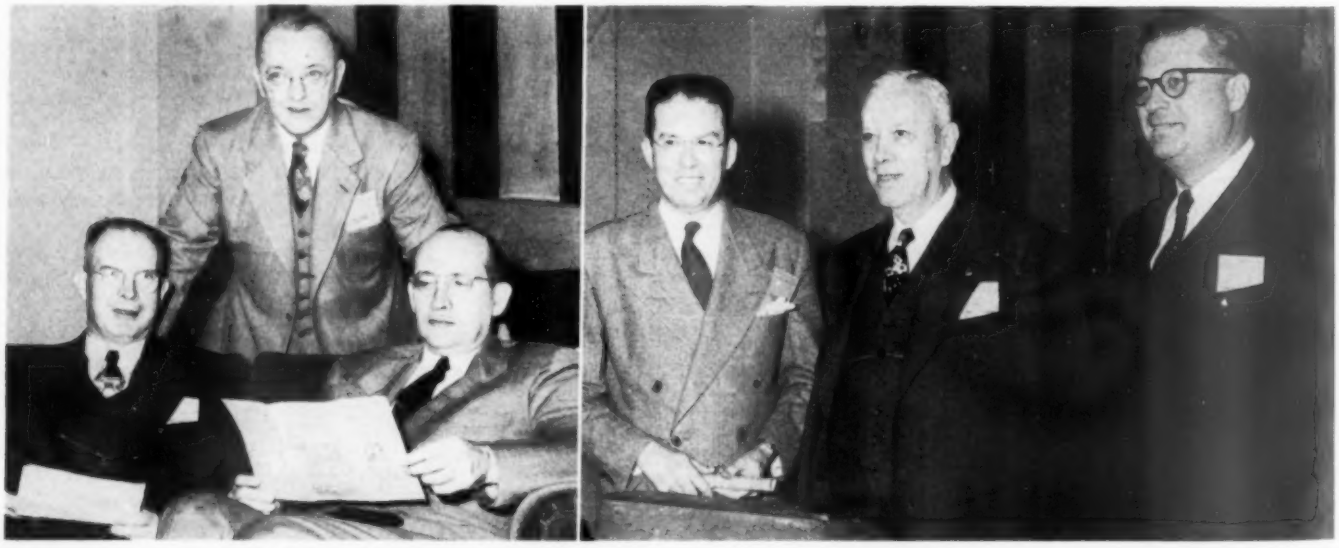
Walton L. Woody, vice president, National Malleable & Steel Castings Co., Cleveland, and vice president of the AFS, in responding to the welcome, outlined the setup and scope of activities of the society. He stated that the AFS has 47 chapters, and a total membership of approximately 10,000 covering men in the production of all types of castings.

A session on nodular gray iron, with Dr. George N. Enos, professor of metallurgical engineering, as chairman, drew considerable interest. Charles O. Burgess, technical director, Gray Iron Founders' Society, Cleveland, discussed the production phases of nodular iron, the raw materials used, the practice followed and the problems that develop in the manufacturing process. He discussed in some detail the result of a questionnaire which indicated that a sizable number of foundries have been investigating nodular cast iron, that some are at a point where sample castings can be supplied, and that a few are in commercial production.

Mr. Burgess estimated that approximately 40 tons of nodular iron a week are now being produced, and anticipated that this would step up rapidly. The study indicated that nodular iron is being used in such castings as camshafts, bell bodies and covers, high temperature applications, diaphragm parts, gears, agricultural machinery, compressors, pressure pipe, oil field and refinery castings, steel mill castings, etc.

At the afternoon session, with J. F. Krueger, Department of General Engineering, as chairman, Ralph L. Lee, secretary-treasurer, Grede Foundries Inc., Milwaukee, discussed "Cost Rec-

(*Continued on page* 144)



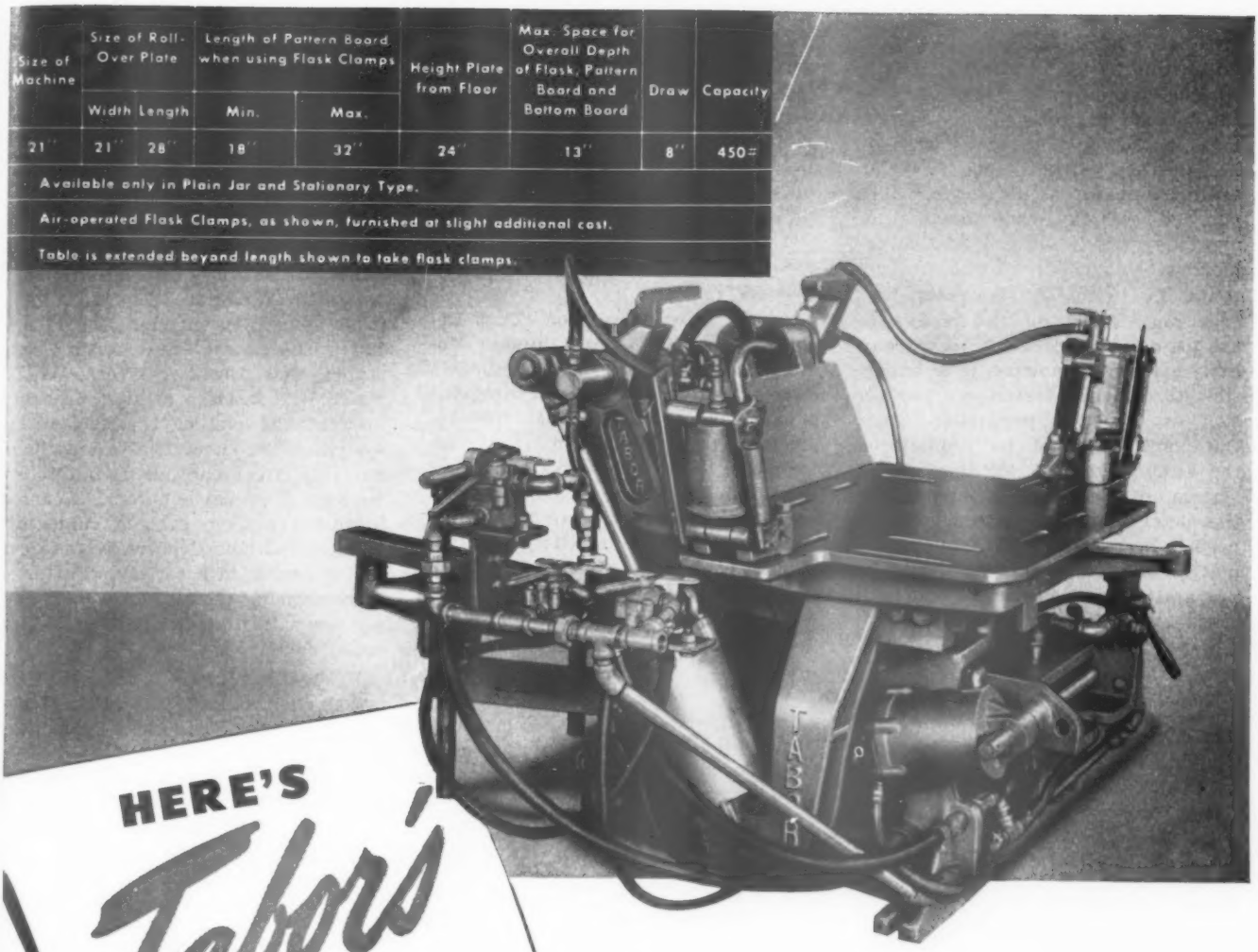
Some of the participants in the Purdue conference. Left to right: G. N. Enos, Purdue; R. L. Lee, Grede Foundries, Milwaukee; C. O. Burgess, Gray Iron Founders' Society, Cleveland; H. A. Bolz, Purdue; W. L. Woody, National Malleable & Steel Castings Co., Cleveland, and national AFS vice president; L. L. Andrus, American Wheelabrator & Equipment Co., Mishawaka, Ind.

Size of Machine	Size of Roll-Over Plate		Length of Pattern Board when using Flask Clamps		Height Plate from Floor	Max. Space for Overall Depth of Flask, Pattern Board and Bottom Board	Draw	Capacity
	Width	Length	Min.	Max.				
21"	21"	28"	18"	32"	24"	13"	8"	450#

Available only in Plain Jar and Stationary Type.

Air-operated Flask Clamps, as shown, furnished at slight additional cost.

Table is extended beyond length shown to take flask clamps.



HERE'S Tabor's 21" ROLLOVER ...small and completely power-operated

Tabor, foremost name in foundry molding machines, shows the way again—to completely power-operated production of small or medium-sized molds and cores.

It's wrapped up in a rugged, well-designed machine—our new 21" Rollover. Air-operated clamps grip the flask. A powerful cylinder Jar-Rams the mold. Rollover and drawing operations are power controlled. Air-operated leveling device insures a perfect, right-angle draw.

No foundryman can afford not to utilize the advantages—in upped production, in reduced operator fatigue—made possible by this machine. It's described fully in the new Rollover Bulletin No. 494—just off the press. Write for your copy. And if you need further details or assistance, you'll find Tabor on the job.

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, Calif.; The PacificGraphiteCompany,Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; M. W. Warren Coke Company, 1017 Olive Street, St. Louis 1, Mo.; E. R. Frost Company, Inc., Minneapolis 14, Minn.; Harry H. Reich, Trussville, Ala.

MANUFACTURERS FOUNDRY EQUIPMENT ASSOCIATION INC.

The TABOR Manufacturing Co.

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

(*Continued from page* 142)

ords and Methods of Determining Costs." Mr. Lee indicated that while each branch of the foundry industry has a good uniform cost system, it must be adapted to the particular needs of the individual foundry. Costs are most important in showing what you did yesterday, what you are doing today and what you will do tomorrow.

Mr. Lee stressed the point that cost work must get the results to the job quickly, otherwise they are of little value. Frequently, it is impossible to compare yesterday's production with today's production, since the plant may not be running on the same castings. But a good cost system intelligently applied, permits the determining of various factors needed in producing a proper estimate. Mr. Lee then explained the preparation of the estimate and indicated that this estimate, when properly prepared, can become the production standard. He emphasized the need for checking and rechecking estimate sheets with each change in labor rates. Daily labor report sheet should reach the foremen by noon the following day. In answer to a question, the speaker said that the battle between practice of selling by the pound and by the piece has not yet been settled and probably never will be.

In the second paper on "Cost Reduction in the Foundry through Motion Study" by Dr. M. E. Mundell, professor of general engineering, the point was emphasized that cost reduction through motion study requires an open mind in approaching the problem. The speaker cited a number of foundry examples where motion study improved production and reduced costs. One, a study of a 200-lb drawbar core, resulted in 40 per cent more production and a 30 per cent reduction in cost. A 23 per cent saving resulted in a study of casting shakeout operations, and other types of savings resulted from similar studies.

At the banquet on Thursday evening, with L. L. Andrus, vice president, American Wheelabrator & Equipment Co., Mishawaka, Ind., as toastmaster, Dr. L. M. Sears, professor of history, and an eminent American historian, discussed in a most interesting manner "World Affairs—The Latest Phase." Dr. Sears stated that the two World Wars, which he considers as one, probably brought the end of the capitalistic system as we know it. We may have no more great capitalists, but today we have great labor barons. Leaders in industry have become subjective to merciless labor leaders. New forces are emerging in a society. Power is more enticing today than wealth and we are witnessing the rise of a new social class.

Friday morning, with Paul H. Harlan as chairman, Sil C. Massari, technical director, American Foundrymen's Society, presented "Fluid Flow in Transparent Molds," a motion picture based on the results of an extensive research sponsored by the society and directed by the Aluminum & Magnesium Division. The work was done at Battelle Memorial Institute.

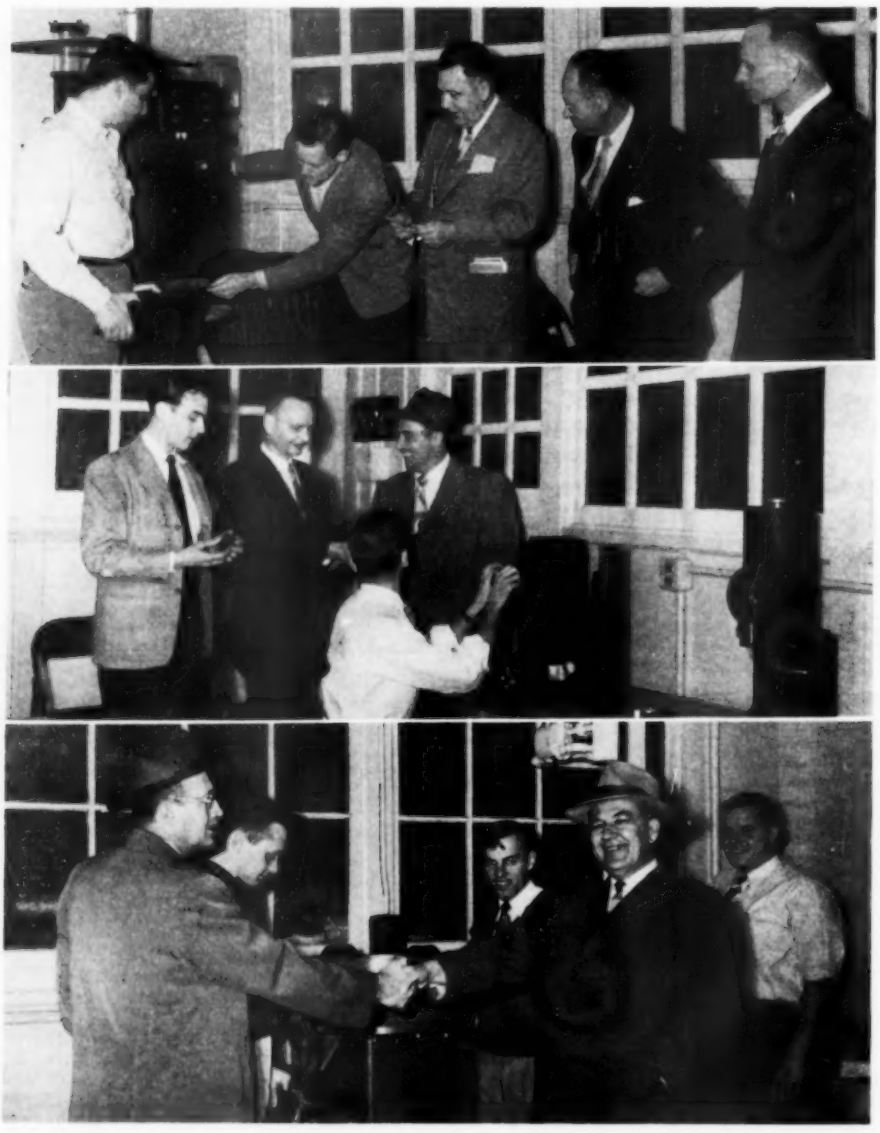
Research Projects Described

Mr. Massari also outlined the sponsored research projects of the society which were authorized by the board of directors in 1946. The plan provides for research by the eight divisions with each receiving a grant of $5000 to undertake the work. The film represents the first project under that plan.

In the second morning session with Dr. I. W. Burr, professor of mathematics as chairman, Arthur Bender, Delco-Remy Corp., Anderson, Ind., discussed "Controlled Product through Controlled Processes." With the aid of charts, a pin ball machine and other excellent props, Mr. Bender outlined the fundamentals of statistical quality control. By thinking of quality as something which can be assigned a number or count, it is possible to predict the pattern which will result when the materials are inspected.

Friday afternoon, Tom E. Barlow, Eastern Clay Products Inc., Jackson, O., discussed "Major Sand Problems from Minor Sand Changes," with Prof. C. T. Marek as chairman. The speaker pointed out that in actual

(*Concluded on page* 146)



Views of laboratory visits at the Purdue Metals Casting Conference

A Practical Foundry Man Speaks on Bayflex®

City Brass Foundry

Brass, Bronze, Aluminum Castings, Babbitt and Solder

323 DANFORTH STREET

FALL RIVER, MASSACHUSETTS May 10, 1949

Bay State Abrasive Products Company
Westboro, Massachusetts

Gentlemen:

This letter is written to express our gratitude. The facts are as follows:

My father and I have been in the non-ferrous foundry business for thirty years. For twenty-eight of those thirty years one of the curses of our business was cutting off gates and risers, snagging off the stumps, and removing the imperfections at the parting line of the cope and drag. For twenty-eight years, during which time we must have performed these operations at least half a million times, it was always a case of doing a dangerous, difficult and annoying job -- we hated it.

For the last two years, the curse has been taken off the job because we have been using Bayflex and that is why we are grateful!

We think other non-ferrous foundry men will also be grateful if you will tell them in simple straightforward language about these tough, efficient, and extremely useful wheels. We know the foundry business and foundry men. Foundry men are not easily fooled. We suggest you tell these men just four things -- they ll find out the other virtues quickly enough.

1. Bayflex is a very strong, tough wheel and therefore very safe to use.
2. They cut brass, aluminum and other non-ferrous compositions quickly, easily and always remain sharp.
3. These Bayflex wheels cut on the face and both sides so that the gates and risers can be cut off flush with the adjacent surface and thus eliminate snagging. In other words, concurrent cut-off and snagging.
4. The wheels out last the old-fashioned, fragile cut-off wheels several hundred to one.

We are moving to larger and much better premises and we will be glad to have you see Bayflex used as we use it when we get setup in our new quarters.

The attached photographs will prove interesting to you.

You are free to use this letter if it will help you in telling the Bayflex story to other non-ferrous foundry men. Once they use Bayflex they will also be grateful just like ourselves.

Yours very truly,

Earl F. Ellen

Proprietor

This unsolicited letter speaks for itself. We suggest that you try Bayflex wheels. A demonstration of their effectiveness in your foundry is gladly offered. No expense to you.

Write us today.

BAY STATE ABRASIVE PRODUCTS CO.
Westboro, Massachusetts, U. S. A.

Branch Offices and Warehouses,
Detroit — Chicago —
Cleveland — Pittsburgh

Distributors,
Principal Cities

This cut is being made to conform with the contour of a large casting, proving the strength and flexibility of BAYFLEX.

A 14" x 5/32"—24 Grit BAYFLEX wheel cutting off a sprue attached to an awkward shaped casting.

BAY STATE®

MEMBER OF THE GRINDING WHEEL INSTITUTE

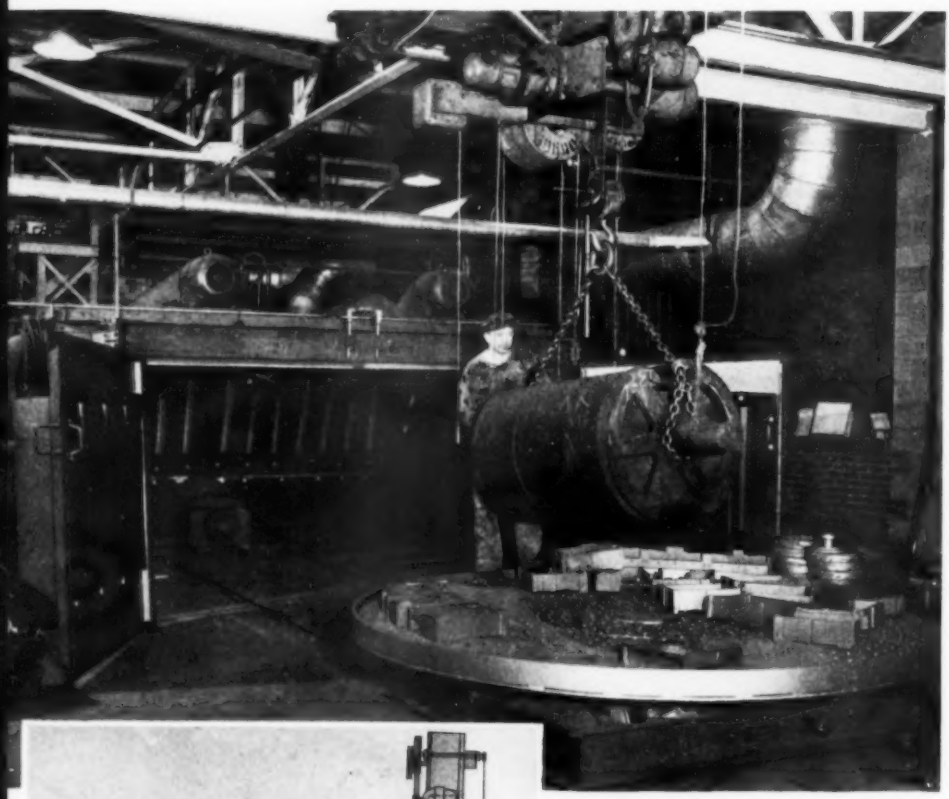
Top Performance Consistently Duplicated

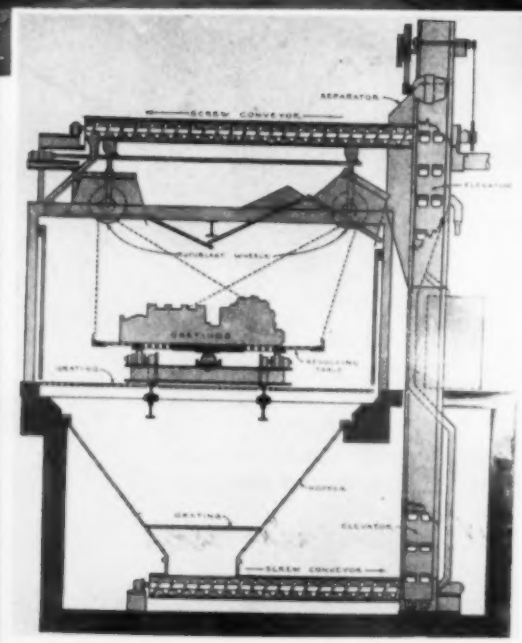
(*Concluded from page* 144)

practice, foundrymen find it possible to depart from strict rules of the textbook and still make good castings. As a result, there may be a tendency to lose proper respect for the sand theory, by assuming that permissible variations from the rigid standards have proved the standard is wrong.

For example, some experts adhere closely to the theory that synthetic sand should be based on a three-screen distribution, while others insist that grain distribution be spread over four, five or six screens. Since the adherents of both theories are capable of making good castings, it would seem other factors are involved which must be considered. One is the fact that in sand control, two wrongs can make a right. Also, since sand practice necessarily includes a safety factor, it is possible to miss the theoretical by a considerable amount and still provide good castings. On the other hand, it is quite common in the foundry to see a gradual change from the specified level of any given property over a period of time, with ultimate disaster.

Mr. Barlow developed the general premise through examples dealing with individual physical or mechanical properties of sand. He pointed out that screen distribution of sand seldom is either of the three-screen or the completely spread type for any given period of time, since sand or screen distribution is actually related primarily to coreroom activities. If there is an appreciable dilution from the core sand, eventually core sand will predominate in the system. In a like manner, he showed how screen strength of any specific figure, such as 11 pounds, can gradually be reduced over a period of time to as low as 9.1 lb without any serious harm. But when the screen strength reaches that point, even a very slight change can swing the castings from good to bad. He stated that the final possibility of confusion may come from an attempt to form a direct relationship between sand tested and the ultimate property. Sand tests require interpretation and understanding, rather than recording or direct reading.





Castings Handled Easily In

New Airless Blast Room

NEW type airless blast room has been installed at the foundry of Harris-Seybold Co., Cleveland printing press manufacturer. Built by the Pangborn Corp., Hagerstown, Md., the unit not only simplifies the handling of large castings but also improves working conditions by permitting the operator to remain outside the room.

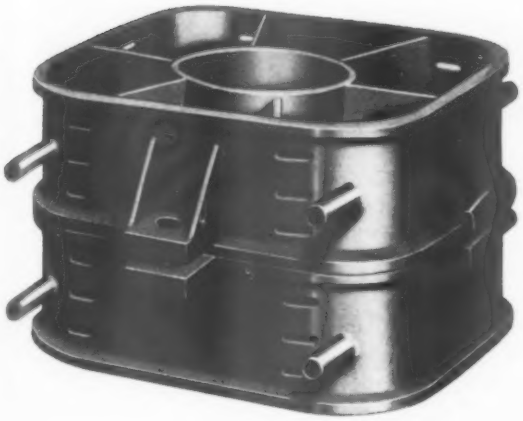
As shown in the accompanying illustration, a power-driven car is provided to bring the work to and from the blast room. It operates on its own track and enters the blast room through wide (12½ ft) doors. A revolving work table 10 ft in diameter is on top of the car and is turned mechanically by contact with a friction wheel to expose all sides of the castings to the blast streams. The table may be turned at speeds ranging from 4.3 to 13 rpm.

The rubber-lined blast room, 15 x 16 x 7¼ ft, is served by two airless blast units and an abrasive separator which cleans the metal abrasive and returns it by bucket elevator and screw conveyor for reuse.

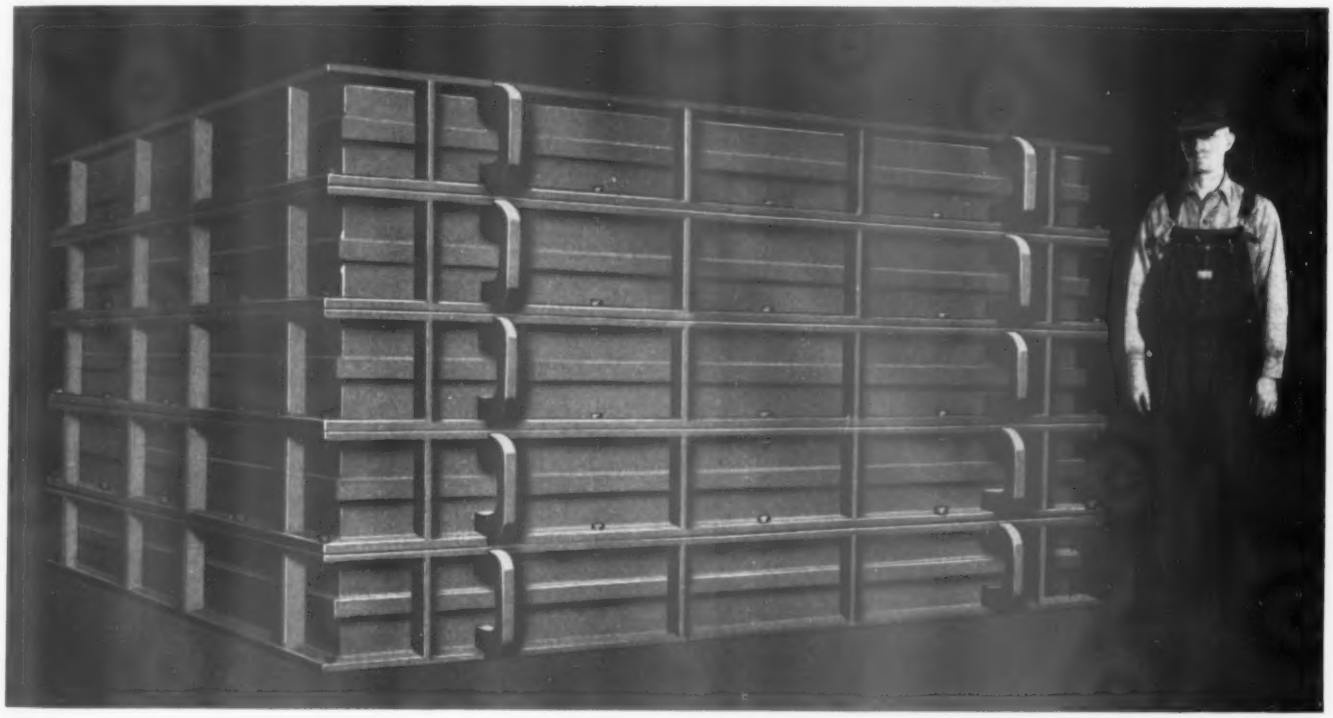
Some of the company's castings contain long hollow areas impossible to reach with any kind of automatic cleaning, but the room-type structure facilitates any necessary air-blast touch-up. Capacity of the unit is sufficient to permit cleaning operations to be conducted in a single eight-hour shift, whereas previously the cleaning room was kept busy 24 hours a day.

Left—Cross-sectional view of blast room. Used abrasive collects below the floor and returns automatically to the blasting units

Above—Power-driven car, equipped with revolving table, facilitates handling of large castings. Car operates on its own track

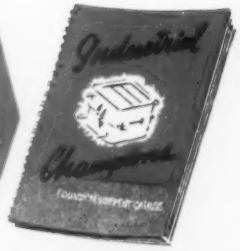


130 LB.
or
13,000 LB.
FLASKS



Need a featherweight or a heavyweight? Industrial's "Champion" line will meet any of your flask requirements. High-tensile alloy steel, controlled welding and anneal-normalizing are combined to produce foundry equipment built stronger to last longer.

Write for catalog



INDUSTRIAL FABRICATING, INC.
TELEPHONE 6781
816 HALL STREET • EATON RAPIDS, MICHIGAN

INDUSTRY Briefs

COATES CO., Phoenix, Ariz., a newly formed corporation, has purchased the Arizona Iron Works, Nineteenth Ave., & Harrison St., Phoenix, and the Capitol Foundry Co., 502 South Fifteenth Ave., Phoenix, whose operations will be combined to supply equipment to Arizona mines and industry. Arthur E. Coates, president, Coates Steel Products Co., Greenville, Ill., is head of the new firm. Jack Frye, president, General Analine & Film Corp., New York, and John Bugas, vice president and director of industrial relations, Ford Motor Co., Dearborn, Mich., are directors. E. A. Spring, former half-owner of Capitol Foundry, is general manager of the entire project, and John F. Thomas, former secretary and manager of Capitol, will assist him in the operation of the iron works.

* * *

SPO Inc., Cleveland, has purchased the business of the Milwaukee Foundry Equipment Co., Milwaukee, which will be known as the Milwaukee Foundry Equipment Division of SPO Inc. The Milwaukee lines of molding machines, core blowers and grinders and briquetting presses will be continued, as will the SPO lines of molding machines, vibrators and foundry patterns. Each line will supplement the other and will be expanded as conditions dictate. Locations and operating personnel will be maintained as at present.

* * *

Simonds Abrasive Co., Philadelphia, manufacturer of grinding wheels and abrasive grain, has appointed Van Kleeck-Wilson Inc., 29 Wilkeson, Buffalo 2, distributor for its products in the Buffalo area, effective Jan. 26. H. R. Van Kleeck, formerly sales manager, Oliver Abrasive & Tool Co., Buffalo, and Frank M. Wilson, until recently a manufacturers' representative there, organized the new company to offer specialized service in abrasives and tools.

* * *

Allied Foundry Co. Inc., 2 Pacific Ave., Jersey City 4, N. J., has been organized to operate the former plant of American Foundry & Castings Co., at that address, in production of soil pipe. The new company plans to reach 45 tons daily production in February, later working up to full capacity of 70 tons when necessary new equipment is installed. J. Zelinger, an officer of the new company, acquired property and assets of American Foundry & Casting Co. last summer, when the latter was forced into receivership.

* * *

United Engineering & Foundry Co., Pittsburgh, has acquired Stedman's Foundry & Machine Works, Aurora, Ind., in a sales contract involving approximately $1 million. K. C. Gardner, president of United Engineering, has been named chairman of the Stedman board of directors, with G. B. Beard as president, George V. Lang, treasurer, and Lester Etter, secretary - assistant treasurer. The Stedman plant employs 200 persons and produces rolls and rolling mill machinery.

* * *

Yale & Towne Mfg. Co. has established a regional branch and sales office in a new building located at 815 N. LaSalle St., Chicago, to provide that district with facilities for service, maintenance, spare parts and counsel on material handling equipment. Arthur H. Dobler has been named Chicago regional manager, industrial trucks and scales; Floyd A. Dewey, regional manager, hoists; Earl E. Thulin, regional manager, railroad department; and R. A. Rieger, manager of service.

* * *

Pittsburgh Mill Steel Co., 366 Madison Ave., New York, Alice G. Hansen, president, has purchased two foundries from the General Services Administration, Washington. One plant, at Crum Lynne, Pa., was once operated by the Atlantic Steel Castings Co. The other, at Baltimore, was once owned and operated by A. Weiskittel & Sons and is equipped to produce gray iron castings and soil pipe. Another section produced magnesium castings during the war.

* * *

Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif., has changed its name to Kaiser Aluminum & Chemical Corp. Name of the company which handles sale of the company's products has likewise been changed, from Permanente Products Co. to Kaiser Aluminum & Chemical Sales Inc.

* * *

O. J. Shafer Pattern Works Inc., Cincinnati, has been bought by William A. Koetter and William Mentrup

(*Continued on page* 150)

NEW LABORATORY: Edward Valves Inc., subsidiary of Rockwell Mfg. Co., East Chicago, Ind., manufacturers of cast and forged steel valves for high temperature and high pressure service, held open house Sept. 16-17 to celebrate opening of the new chemical, physical, and metallurgical laboratories shown above

AJAX-NORTHRUP MELTING HITS COMPOSITION

"Right on the Nose"

And every heat of today's high-performance alloys *must* be checked out "right on the nose." The slightest oxidation or contamination means rejected castings—or loss of time and alloying constituents trying to bring the melt up to par.

That's why more and more foundries, alloy steel plants, and precision casting shops are turning to Ajax-Northrup melting as the only practical, economical way.

Ajax-Northrup high frequency furnaces stir as they melt — electrically. There's no carbon to contaminate the charge. One user holds carbon content within two one-hundredths of one per cent. It's so fast there's no oxidation. Savings in constituents and deoxidizers alone give Ajax-Northrup furnaces a two-to-one cost advantage in a nickel-steel plant. Melts fast or slow, or holds steady temperature. Easy to charge, requires little attention while melting.

33 YEARS OF EXPERIENCE

By combining the right work-proven Ajax-Northrup units with the right controls, we can tailor high frequency melting to your requirements. Motor-generator power from 25 to 1200 kw. and up. Self-tuning, trouble-free spark-gap converters from 3 to 40 kw. Furnaces from one ounce to a ton for all non-ferrous, and precious metals—to 8 tons for ferrous metals. Just name your alloys and quantities—we'll send you the proper technical bulletins—free.

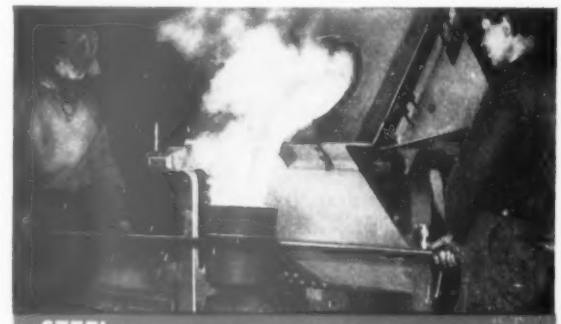
AJAX ELECTROTHERMIC CORPORATION

AJAX PARK, TRENTON 5, N. J.

SINCE 1916

AJAX NORTHRUP

HEATING & MELTING



STEEL

BRASS AND BRONZE

ALLOY CAST IRON

PRECISION CASTING

117

Associate Companies

THE AJAX METAL COMPANY • AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC. • AJAX ENGINEERING CORPORATION

(*Continued from page* 148)

Jr., veteran employees of the company. Oscar L. Shafer is retiring as president after 54 years with the organization and William F. Stockhove, secretary, who has been associated with the company since 1891, also is retiring. The new owners will continue to operate the company under its present name and to supply wood and metal patterns for iron, steel and nonferrous foundries.

* * *

American Machine & Foundry Co., 511 Fifth Ave., New York 17, producer of high precision, automatic machinery, has acquired all properties and assets of DeWalt Inc., Lancaster, Pa., manufacturer of radial saws for high speed cutting of wood, light metals and plastics, in a contract involving approximately $1 million. Operation of the 75,000 sq ft DeWalt plant will continue with present personnel, through a wholly-owned subsidiary.

* * *

Lou Mervis, head of Pittsburgh Gear Co., Pittsburgh, has acquired controlling interest in Ottumwa Iron Works Inc., 402 West Main St., Ottumwa, Iowa. Mr. Mervis is president of the Ottumwa Works, E. R. Phillips, vice president in charge of sales, Francis Knuth, vice president, Myra Mervis, treasurer, and John Thurlow, secretary.

* * *

Chemsteel Construction Co., 5428 Walnut St., Pittsburgh, has formed a new associated company, Affiliated Furnace & Engineering Inc., at the same address, to specialize in design, construction and maintenance of industrial furnaces. Officers are: Arthur M. Krieger, president and general manager; Clarence B. Avery, vice president, engineering; Merrill A. Stewart, vice president, construction; and Charles E. Stone, secretary-treasurer.

* * *

Ohio Steel Foundry Co. has suspended operations at the Central Foundry of its Lima, O., plant. The company will continue to operate the North Foundry at Lima, producing only steel and iron rolls, and the Lima machine shop for machining rolls and pressure castings. The Springfield, O., plant will continue production of small miscellaneous steel castings, valves, fittings and the company's regular line of heat and corrosion resistant castings.

* * *

Beardsley & Piper Division of the Pettibone Mulliken Corp., Chicago, recently has purchased the molding machine line of Johnston & Jennings Co., Cleveland. U. S. Molding Machines, formerly produced by Johnston & Jennings, now will be built at the plant of Beardsley & Piper in Chicago and will be serviced from there.

* * *

American Manganese Steel Division, American Brake Shoe Co., New York, has appointed Whitehead Metal Products Co., 303 West Tenth St., New York 14, distributor of its line of welding products. Whitehead company operates warehouses in New York, New Jersey, Pennsylvania, Massachusetts and Maryland.

* * *

Giffels & Vallet Inc., Detroit, associated engineers and architects, has formed a Canadian subsidiary under the name of Giffels & Vallet of Canada Ltd., located at 210 Canada Trust Bldg., Windsor, Ont. American offices of the parent company are also maintained in New York and Chicago.

* * *

Milton A. Meier Co., 816 New Center Bldg., Detroit 2, has been appointed distributor of aluminum pig and ingot products for Reynolds Metals Co., Louisville, in an area covering Detroit, the southern half of Michigan, as well as Fulton, Williams, Ottawa and Lucas counties in northern Ohio.

* * *

Laclede-Christy Co., St. Louis, has acquired all capital stock of Diamond Fire Brick Co., Canon City, Colo. J. L. Cummings, Pittsburgh, has been elected executive vice president, and D. M. Rice, St. Louis, vice president-general manager, of the new plant, which produces fire clay brick and silica brick.

* * *

Big Rock Plow Point Co., Chesaning, Mich., has completed a 40 x 90 ft, one-story foundry addition, of concrete block. A 14-ft square pit has been sunk in the addition, to support a machine for manufacture of soil pipe. Louis Bila is owner and manager.

* * *

Non-Ferrous Perma Mold Inc., a new company owned jointly by the Barnes Mfg. Co., 651 North Main St., Mansfield, and Non-Ferrous Die Casting Co., London, England, has been incorporated in Mansfield. Millard Pryor is president of the new permanent mold casting plant.

* * *

Whiting Corp., Harvey, Ill., and Los Angeles, has appointed Carl F. Miller & Co. Inc., with offices at 1217 Sixth Ave. S., Seattle, and 121 S. Madison St., Spokane as agents to handle its varied line of foundry equipment.

* * *

Development-Research Corp., has changed its address to 1146 North Las Palmas Ave., Los Angeles 38, from Box 6, Grand Ave. Station, Elsinore, Calif.

* * *

American Furnace & Foundry Co. and American Boiler & Foundry Co., Milan, Mich., subsidiaries of Maumee

(*Concluded on page* 152)

UTILITY AIRPLANE: Foundries Materials Co., Coldwater, Mich., puts its airplane to use making emergency deliveries of its products and transporting company personnel on business trips

FOR FAST, ACCURATE LINE-UP OF COPE AND DRAG, USE UNIVERSAL FLASK PINS AND BUSHINGS

Once you install Universal precision made Standardized Flask Pins and Bushings *you can forget about cope and drag alignment troubles.* Universal Flask Pins and Bushings are hardened and ground for maximum resistance to wear. Cope Bushings are quickly guided to the Drag Pins over tapered, loose-fitting closing pins which are easily removed after assembly. Special design permits longitudinal expansion to compensate for metal heat, *without affecting accurate alignment.*

Available for immediate delivery in several sizes of round, elongated, press fit and taper types for use in cast iron, steel, aluminum, and magnesium flasks. *Special types and sizes to order.* Write for complete information.

UNIVERSAL ENGINEERING COMPANY

FRANKENMUTH 4, MICHIGAN

(*Concluded from page* 150)

Malleable Castings Co., Woodville St. & Wheeling & Lake Erie Railroad, Toledo 5, O., have completed a plant expansion and equipment improvement program at a cost of $250,000.

* * *

Randall Graphite Bearings Inc., 609 West Lake Rd., Chicago, has purchased the foundry and machine shop of Shook Bronze Corp., Greenlawn Ave. & Lake St., Lima, O., which will be operated as the Shook Bronze Division.

* * *

Service Conveyor Co., Detroit, has appointed the High Frequency Foundry Sales Corp., 76 Beaver St., New York, to handle its line of conveyors, cranes and related equipment, in New York, New Jersey, New England and eastern Pennsylvania.

* * *

Directors of Centrifugal Pipe Corp., New York, have authorized dissolution of the company. The corporation has held agreements to license makers of cast iron pipe under the De Lavaud process, all of which major licenses have expired.

* * *

Thumann Brass Foundry, manufacturer of brass, bronze and aluminum castings, and formerly located at 212 N. Anna St., Stuttgart, Ark., has moved its foundry to 137 E. Bodley Ave., Memphis, Tenn., P. O. Box 2451.

* * *

Goss Printing Press Co., Chicago, has closed the foundry of its Duplex Division, McCamley & Houston Sts., Battle Creek, Mich. The company is now purchasing castings from outside suppliers.

* * *

Newnam Foundry Co., S. Main St., Kendallville, Ind., has completed construction of a new cleaning and shipping room, built as an addition to the original foundry building.

* * *

E. H. Sargent & Co., manufacturer and distributor of scientific laboratory instruments, apparatus and chemicals, has completed a new plant and office building at 4647 West Foster Ave., Chicago 30.

* * *

Eutectic Welding Alloys Corp., 40 Worth St., New York 13, formally opened its new welding rod and electrodes manufacturing plant in Flushing, N. Y., on Oct. 7.

* * *

Chas. Taylor Sons Co., P. O. Box 58, Annex Station, Cincinnati 14, manufacturer of special refractories, has built a new tunnel kiln at its Taylor, Ky., plant.

Mechanized Foundry

(*Continued from page* 69)

fruit and vegetable markets.

The loaded trays are pushed across or carried to a battery of grinding stands facing the belt on the side opposite where the trays are loaded. Before each grinding operator finishes the contents of one tray, another loaded tray is available. In this manner he is kept constantly employed on the phase of operation in which he is specially skilled.

An efficient dust collection system, with units at every operating station, removes all dust and maintains an atmosphere that compares favorably with that outside the building. The same general air of cleanliness, evidence of the management's interest in the comfort and welfare of the employees, prevails throughout the entire plant. The general effect is emphasized by the ample daylight streaming through the windows which form the greater part of the side and end walls of the building.

Iron Melted Continuously

Metal for the castings is melted in twin cupolas lined to a diameter of 42 in. Each cupola is operated on alternate days and melts continuously from 7 a.m. to quitting time at 3:30 p.m. Iron of uniform composition—C 3.20, Si 2.80, Mn 0.75, S 0.09, P 0.20—tapped at exceptionally high temperature, 2900° F, shows a tensile strength of 30,000 psi. Charges for the cupola are made up of 25 per cent pig iron, 15 per cent steel, 30 per cent purchased scrap, and 30 per cent home scrap—gates, sprues, scrap and over iron. The over iron is collected from a group of long pig molds in which small quantities of iron left in the ladles are dumped, before the ladles are refilled with fresh hot metal from the mixing ladle under the cupola spout. Each pig mold is supported by pivots at either end.

Instead of the usual gap in the center of the upper edge, each pouring ladle is equipped with a long, narrow spout. The operator can bring the tip of the spout close to the sprue opening, whether in the center or close to one side or one end of the cope. Volume and speed of the stream can be nicely controlled.

Metal from the cupola, tapped at regular intervals, flows into a round-bottom, rectangular insulated mixing ladle, totally enclosed with the exception of a small opening on top for entrance of the metal, and a teapot opening at the side near one end, for transferring the metal to a constant procession of pouring ladles suspended from a monorail.

Iron does not run over the end of the spout in the usual manner. The outer end of the spout is closed and the inside of the spout is bricked to form a large well, or reservoir. It is claimed there is practically no drop in temperature between the metal leaving the cupola tap hole and a 2-in. diameter hole in the bottom and about a foot from the outer end of the spout. Trunnions on the mixing ladle rest in bearings on top of cast iron standards, and these in turn are mounted on concrete foundation blocks. A hand wheel and worm gear at one end enable the operator to tilt the ladle back and forth readily. A light steel plate, 15 x 18 in., attached to the outer, upper edge of the ladle, prevents heat and sparks from the metal flowing through the hole in the bottom of the spout, from coming into contact with the men pushing the loaded ladles in the direction of the waiting molds.

Slag which flows through a slag hole in the back of the cupola is met by a stream of water which breaks it up into roughly granulated form. The combination of slag and water flows down through a long trough to a sump just outside the wall of the building. The water drains away and the accumulated slag is removed periodically. Some of the material is used for fills on the company's property and the remainder is taken and used as an aggregate in building concrete-surfaced roads, floors in industrial plants, driveways, etc.

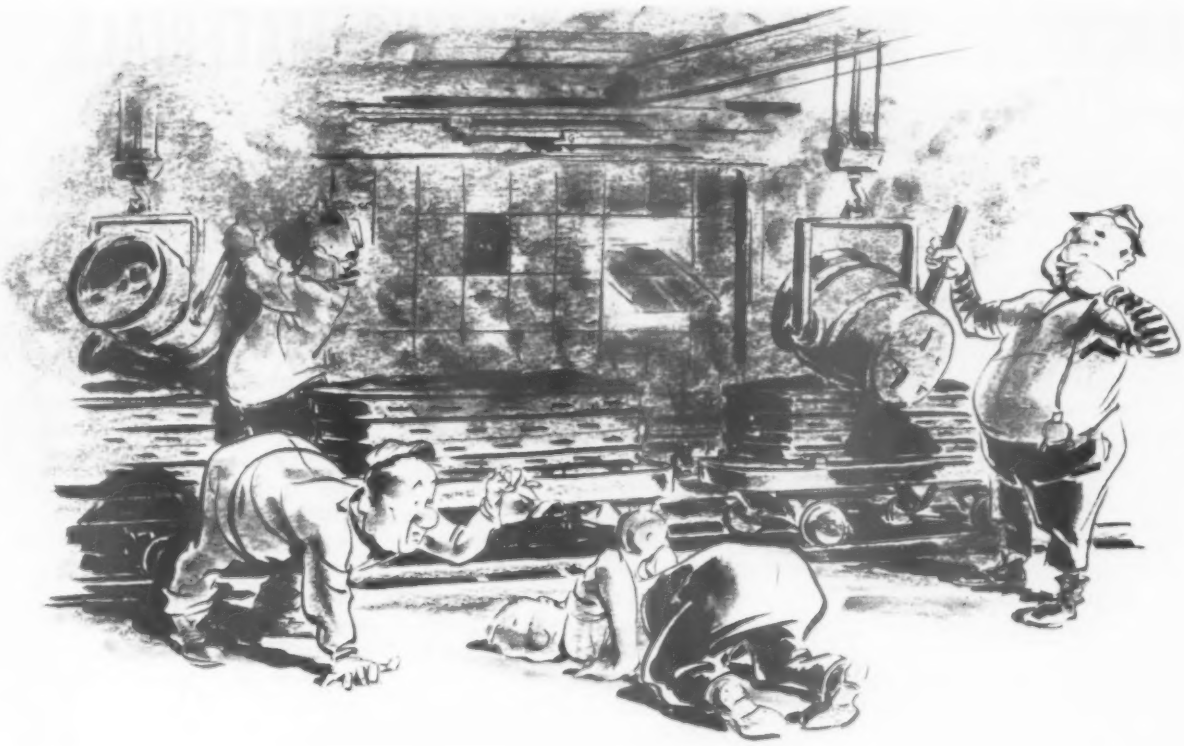
Stockyard Served by Crane

The stockyard outside the cupola building is served by a gantry type crane. The inner carriage travels on a high steel runway. The outer end of the bridge is supported on a fabricated stiff leg. A carriage on the lower end of the leg travels on a rail laid on a concrete retaining wall at ground level. The wall also separates the yard from the railroad track alongside and at a lower level.

Incoming raw materials—pig iron, iron and steel scrap, coke and limestone—are unloaded from railroad cars by the crane, iron and steel by magnet, coke and limestone by grab bucket. Iron and steel are piled up in the yard. Coke and limestone are placed in large open concrete bins. The required amount of coke and limestone are transferred each day to a hopper with two compartments and provided at the bottom with suitable gates. The charging buckets

(*Concluded on page* 154)

"We should work down here— where breathing is easier!"



Schneible Multi-wash Systems give clean, fresh air to the roof!

You might be surprised if you saw this situation in your foundry—yet your workmen may have thought of such a thing.

Perhaps a look at your foundry will show need for improvement in ventilation which may very well result in improved labor relations and increased production.

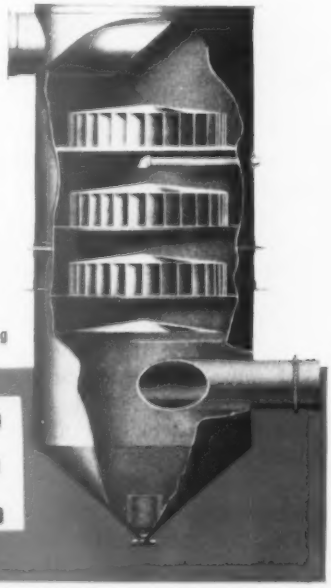
Schneible Multi-wash systems provide the answer to better, cleaner, foundry ventilation control. Our Uni-flo hoods cover all phases of foundry operation from production molding to large quad shakeouts.

Keep that production curve going up —call in Schneible engineers and get the details on the Multi-wash system that will best do the job. Schneible Engineers are located in principal cities.

MULTI-Wash COLLECTORS

Model HC—1500 to 30,000 c.f.m. or multiple units for larger capacities.

Model JC—1000 to 30,000 c.f.m. or in multiple units, if greater capacity desired.



CLAUDE B. SCHNEIBLE COMPANY

P. O. BOX 50-1 DETROIT 32, MICHIGAN

U. S. and Foreign Patents Pending

SCHNEIBLE

(*Concluded from page* 152)
rest on a platform scale where the craneman manipulates a magnet to load them with the required amount of pig iron and scrap. The bucket then is placed under the big hopper where an attendant opens the hopper gates and adds coke and limestone to the charge. The attendant also makes any necessary slight adjustment in the weight of the material loaded by the crane.

A skip hoist carries the bucket up to the charging door and spills the load into the cupola. Through a suitable switch the bucket may be directed to either of the two cupolas. Blast for either cupola is supplied by an automatically controlled blower which delivers 4200 cfm at a pressure of 22 oz.

AMERICAN SOCIETY FOR TESTING MATERIALS

Holds Pacific Area Meeting

FIRST Pacific Area national meeting of the American Society for Testing Materials, held in San Francisco, Oct. 10 to 14, was attended by over 700. During the meeting 15 technical sessions were held at which 70 formal papers were presented. Of particular interest to foundrymen was a symposium on cast iron sponsored by the society's Committee A-3 on Cast Iron. This session featured four papers relating to various phases of cast iron, and was presided over by Hyman Bornstein, Deere & Co., Moline, Ill., and E. K. Smith, Los Angeles.

First paper, by Charles K. Donoho, American Cast Iron Pipe Co., Birmingham, on "Mechanical Testing and Properties of Gray Cast Iron," described the commonly used tests, such as tensile, transverse, hardness, impact, etc., in the light of their usefulness and meaning. Mechanical tests for evaluation of nodular graphite iron also were discussed. In concluding his paper Mr. Donoho pointed out that increasing section size and increasing carbon equivalent tend to lower the strength values and the hardness of gray cast irons.

Inoculated irons are more consistent and predictable as to the effect of section size. The position of an iron in the tensile-brinell chart affords an indication of the graphite form and distribution. A high ratio of tensile strength to hardness gives the greatest toughness as measured by impact testing. Properties of nodular graphite cast irons are evaluated best by transverse tests with complete stress-strain curves or by steel-type tensile tests on specimens cut from keel block coupons. Nodular irons have tensile-brinell ratios much higher than flake graphite irons and approaching the range of steels, but the compressive strength-brinell ratio is of the same order whether nodular or flake graphite.

Second paper, on "Development, Significance and Uses of Specifications for Cast Iron" was presented by Hyman Bornstein. He stated that early specifications for cast iron adopted by the society in 1905 and continued in force until 1918 specified the transverse breaking load determined on 1.25-in. diam bars, 15 in. long as the prime measure, with loads ranging from 2500 lb for light to 3300 lb for heavy castings. While tension tests were not recommended the minimum tensiles provided ranged from 18,000 psi for light to 24,000 psi for heavy castings.

From 1918 to 1930 numerous investigations on correlation of test bar and casting, effect of section size, impact testing, etc., were carried on by members of Committee A-3, and various specifications for cast iron were revised from time to time. In 1932 a new specification was prepared which, with few changes, is in use today. For the first time tensile strength became the primary item, and seven classes of gray iron were set up in which the tensile strength minimum ranged from 20,000 to 60,000 psi. At present the society has seven specifications relating to cast iron. Two are general and pertain to irons where strength is the major consideration, and where appearance, machinability and dimensional tolerances are the prime requisites. Others relate to valves, flanges and pipe fittings; automotive castings; pit-cast water pipe; soil pipe and fittings, and culvert pipe.

In the absence of R. G. McElwee, Vanadium Corp. of America, Detroit, his paper on "Automotive Cast Iron, Including Brake Drums" was presented by E. K. Smith. According to the author, the ASTM and the Society of Automotive Engineers work together closely and their specifications in general are in complete agreement. Trend in all specifications is toward acceptance of physical standards, with chemical compositions secondary. He pointed out that inoculation is being employed generally in automotive foundries to obtain good physical properties in higher total carbon irons. These irons have lower shrinkage and better founding characteristics than lower total carbon irons.

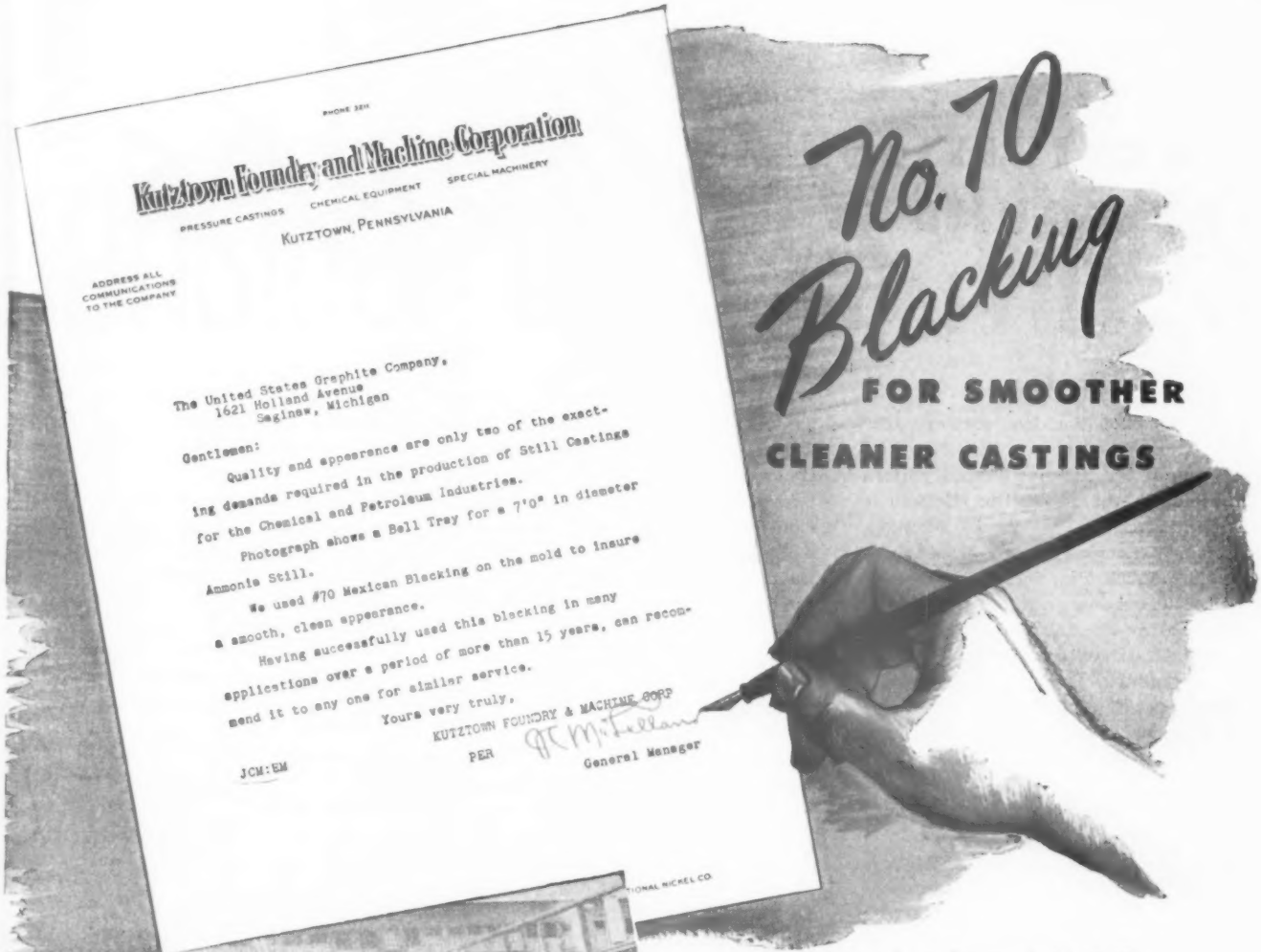
Use of the chill test as a means of control was discussed, and mention was made of the use of a metallographic specification by some casting consumers. Brake drums, according to the author, should have a minimum total carbon of 3.40 per cent, as such irons have a better resistance to heat checking. Additions of molybdenum and vanadium to irons for brake drum applications aid in providing a suitable type of structure.

Final paper of the symposium was by Charles O. Burgess, Gray Iron Founders' Society Inc., Cleveland, and was entitled "Applications and Uses of Gray Iron Castings, Including Significance of Various Properties of Gray Iron." In his opening remarks he drew attention to the importance of gray iron castings in everyday life—some 150 industries depending upon them. He then discussed the various properties of gray iron.

Gray iron owes most of its unique properties to the fact that graphite flakes are distributed uniformly throughout its steel-like mass. Fundamental property conferred by the graphite content is castability which permits forming intricate shapes. It also facilitates the accommodation to and distribution of applied stress through minute plastic movement that takes place during initial loading, and thus gives gray irons a preferred position where strength and rigidity are primary requirements. Wear resistance of gray iron also is attributed to the graphite flakes. Other properties such as corrosion resistance, machinability, damping capacity, freedom from notch sensitivity, etc., also are dependent on the presence of graphite flakes.

In conclusion, Mr. Burgess pointed out that marked improvements in metallurgical and production viewpoints have been and are taking place in the gray iron foundry industry, but it has been so rapid that comparatively few designers have found it possible to take advantage of them.

No. 70 Blacking
FOR SMOOTHER CLEANER CASTINGS


Kutztown Foundry and Machine Corporation
PRESSURE CASTINGS CHEMICAL EQUIPMENT SPECIAL MACHINERY
KUTZTOWN, PENNSYLVANIA
ADDRESS ALL COMMUNICATIONS TO THE COMPANY
The United States Graphite Company,
1621 Holland Avenue
Saginaw, Michigan
Gentlemen:
Quality and appearance are only two of the exacting demands required in the production of Still Castings for the Chemical and Petroleum Industries.
Photograph shows a Bell Tray for a 7'0" in diameter Ammonia Still.
We used #70 Mexican Blacking on the mold to insure a smooth, clean appearance.
Having successfully used this blacking in many applications over a period of more than 15 years, can recommend it to any one for similar service.
Yours very truly,
KUTZTOWN FOUNDRY & MACHINE CORP
JCM:EM
PER
General Manager

The smooth surfaces of this bell tray for a 7' diameter ammonia still, just one of a wide variety of castings produced by the Kutztown Foundry and Machine Corp. for the chemical and petroleum industries, require only a minimum of cleaning—thanks to No. 70 Blacking. No wonder Kutztown writes, recommending the use of No. 70 Blacking. This versatile mold coating penetrates deeply into sand surfaces to form a hard coat which turns out smoother, cleaner castings. It is economical and easy to use. No. 70 can be sifted dry through a cloth bag in treating green sand molds, for it draws sufficient moisture to bond to the sand; or it can be mixed with water to make an excellent wet blacking which assures a hard coat with maximum sand penetration for light and medium weight dry sand, skin dried and loam molds. It is also used by many production foundries to dip small baked cores which need extra protection under intense metal conditions.

• No. 70 Blacking, used by Kutztown in many applications for 15 years and preferred as a general purpose blacking by many other leading foundries, will help you to produce cleaner castings with less trouble and expense. Write for complete particulars.

THE UNITED STATES GRAPHITE COMPANY • SAGINAW, MICHIGAN

DIVISION OF THE WICKES CORPORATION

ACTIVITIES OF FOUNDRY *Groups*

Reading

OFFICERS for the coming year were elected at the Nov. 15 meeting of the Reading Foundrymen's Association held at the Berkshire Hotel, Reading, Pa. A. L. Wentzel, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., was elected president, succeeding Paul B. Harner, Union Mfg. Co. Inc., Boyertown, Pa. George C. Kissell, Fairmount Foundry Co., Hamburg, Pa., was elected vice president; James S. Hinkley, Dick Bros. Inc., Reading, treasurer; and W. I. Cassidy was re-elected secretary.

Executive committee members are: Irwin L. Bossler, American Chain & Cable Co., Reading; Holton Confer, Confer, Smith & Co. Inc., Hamburg; Werner Finster, Textile Machine Works, Reading; Robert Fritch, Union Bronze Co., Sinking Spring, Pa.; Morris McKinney, Dick Bros. Inc., Reading; Clair A. Snell, Keystone Foundry Co., Lebanon, Pa.; James Woodward, Excelsior Brass Works, Reading; and Paul B. Harner.

Preceding the election, a discussion on the care and maintenance of foundry equipment was presented by George B. Comfort, Schramm Inc., West Chester, Pa., who discussed compressors; Raymond J. Shire, Tabor Mfg. Co., Philadelphia, who spoke on molding machines; and F. R. Pedrotty, American Wheelabrator & Equipment Corp., Mishawaka, Ind., who spoke on blast cleaning equipment.—*W. I. Cassidy, secretary.*

Conestoga

CONESTOGA Foundrymen's Association recently has been organized by members of the industry in the Lancaster, Pa., area. Thomas Belfield, Cochrane Brass Foundry, York, Pa., is chairman; Thomas Blank, Carbon Malleable Casting Co., Lancaster, vice chairman; David Keener, Burnham Corp., Lancaster, treasurer; and Henry J. Yeager, foundry consultant, Lancaster, secretary.

Central Michigan

SPEAKER at the technical session of the November meeting of Central Michigan Chapter of the AFS was E. T. Kindt, Kindt-Collins Co., Cleveland, who presented "Comments on the Trends of the Pattern Industry." Mr. Kindt opened his talk by stating that there is a definite lack of co-operation between patternmakers.

There are many ways in which a patternmaker may aid himself in making better patterns and selling them, and Mr. Kindt suggested the following. First, it is important that the patternmaker have a good shop in which to work. Good lighting, good lumber, proper lumber storage, proper equipment and its placement all tend to make a better shop. If possible, the shop should have a nonferrous foundry and a plaster room.

Mr. Kindt also raised the subject of standardization of pattern and corebox equipment. As yet nothing worthwhile has been adopted although there has been talk of standardizing draft, dowel pins, marking and identification of patterns, and ears or plates. In the near future, the speaker feels that plastics will replace some of the materials now being used since they offer the advantages of being hard, easy to cut, no shrinkage, no coating required.

(*Continued on page* 158)

EASTERN NEW YORK Chapter of the AFS met Oct. 18 at the Circle Inn, Lathams, N. Y. At left above is Harry H. Kessler, vice president, Sorbo-Mat Process Engineers, St. Louis, who talked on "Gating and Risering." At right are chapter directors and officers at the speakers' table. Left to right are: J. Waugh, General Electric Co., Schenectady, N. Y., director; Roy Garrison, Adirondack Foundries & Steel Inc., Watervliet, N. Y., director; Alexander C. Andrews, American Locomotive Co., Schenectady, director; Kenneth F. Echard, Eddy Valve Co., Waterford, N. Y., chairman; Mr. Kessler; J. N. Wheeler, Wheeler Bros. Brass Foundries Inc., Troy, N. Y.; J. M. Jones, American Locomotive Co., Schenectady, director, and Prof. S. McKay, Rensselaer Polytechnic Institute, Troy

Consider these savings

MOGUL® Cereal Binder puts money in your pocket in these three ways:

SAVES TIME...
dries quicker

IMPROVES QUALITY
...yields smooth cores

AVOIDS WASTE...
reduces discards

Ask, without obligation, our Technical Sales Department for full technical service in the profitable use of *MOGUL Cereal Binder*.

CORN PRODUCTS REFINING COMPANY

17 BATTERY PLACE • NEW YORK 4, N. Y.

(*Continued from page* 156)

and wear resistance.

Herbert Green, Battle Creek Pattern Works, was in charge of the technical session and the discussion that followed.

A special guest for the evening was W. A. Geisler, foundry managing director, Goetzewerke, Dusseldorf, Germany. He described conditions of foundries in Germany during the recent war and at present.—*F. P. Tobakos, publicity chairman.*

Wisconsin

AT the Nov. 11 meeting of Wisconsin Chapter of the AFS, 143 members and guests heard Edward McFaul, Mid-West Institute, Chicago, talk on "What Is Your Wash Room Rating?" meaning, "What do your employees think and say about you when they get to the washroom at the foundry?" The speaker endeavored to point out means of producing good feeling on the part of employees toward management.

Mr. McFaul stated that supervisors must not use logic altogether in talking to the men since emotion is more important than logic. Foremen and supervisors must be students of human nature, and the speaker reminded the group that one can catch more flies with honey than with vinegar. Talk about bosses is not done in formal groups but is usually casual. The effect on those listening to tirades against supervisors and higher-ups is bad.

F. N. Lloyd and J. R. B. Lloyd, two officers of F. H. Lloyd & Co. Ltd., Northwednesbury, England, were guests at the meeting. Another guest was A. M. Fulton, Northern Malleable Iron Co., St. Paul, a national director of the AFS.

Robert Woodward, president of the chapter, announced that at the Wisconsin regional conference to be held Feb. 9-10 at Hotel Schroeder, Milwaukee, there will be 24 sectional meetings covering all phases of the foundry industry. Oscar Rennebohm, governor of Wisconsin, will be the speaker at the annual banquet.—*John E. Hubel*

Chicago

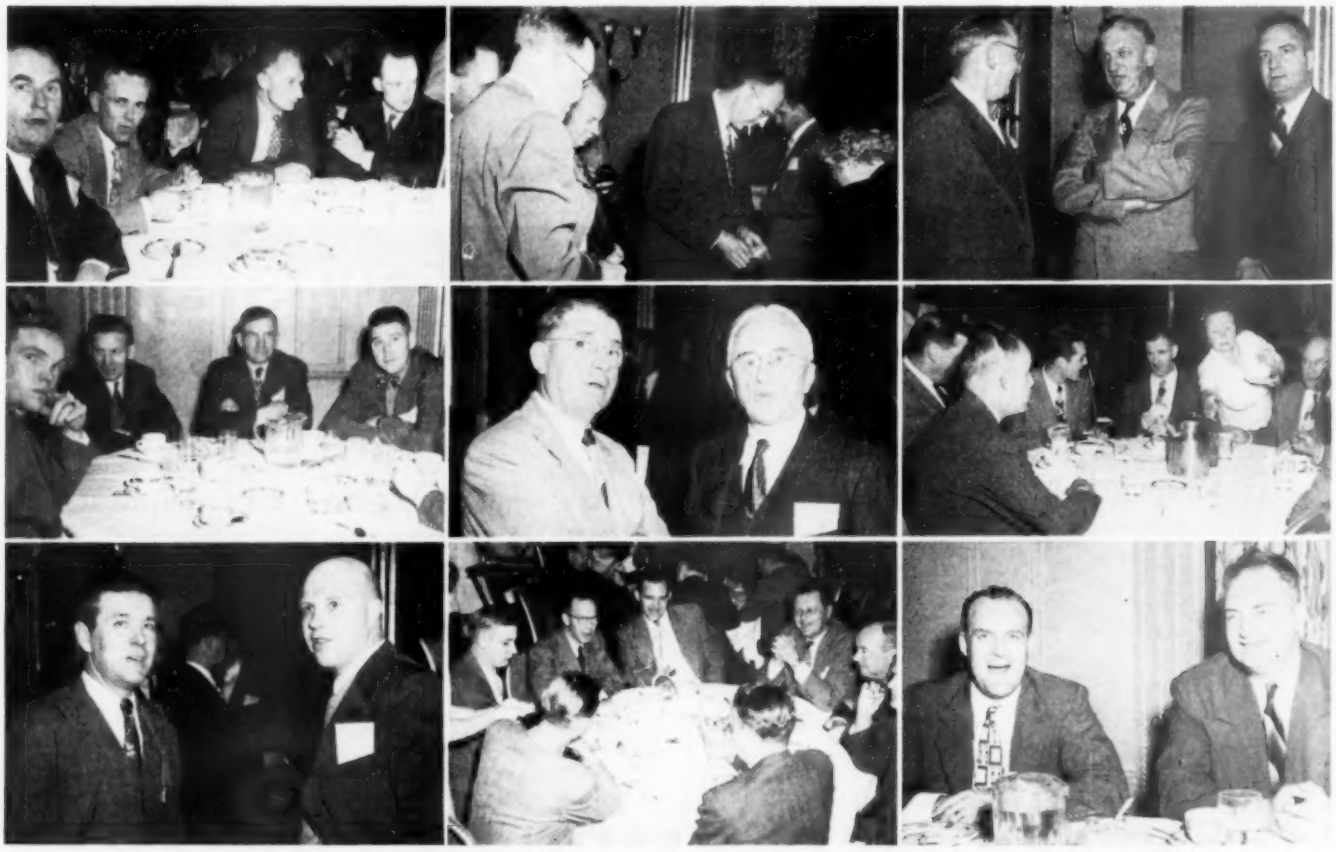
ROUNDTABLE meetings continue to appeal well to members of the Chicago Chapter, AFS. Proof of this was provided by the excellent attendance at the chapter's first of a series of four such meetings during the current year held at the Chicago Bar Association, Nov. 7.

Chapter President W. D. McMillan, International Harvester Co., presided at the general portion of the meeting and introduced several guests. He was assisted in the technical aspects of the program by Chapter Vice President A. W. Gregg, Whiting Corp.

A feature of the meeting was the presence of several Chicago high school foundry instructors as dinner guests. Each was introduced and on behalf of the chapter was presented with an AFS membership by Roy W. Schroeder, assistant professor, foundry and pattern laboratory, Navy Pier Branch, University of Illinois, Chicago, who is chairman of the chapter's Apprentice and Junior Foundrymen's Committee. Mr. Schroeder invited the instructors to encourage their students to attend the chapter's foundry demonstration course series in January, believing that in this way the Chicago Chapter is interesting young men in entering the foundry field.

Instructors given AFS memberships at this meeting and on a previous occasion in June, and the schools they represent, are as follows: Howard W. Smith, foundry supervisor, Chicago Public Schools; John W. Anderson, Lindblom High School; George A. Davis, Crane Technical High

(*Continued on page* 160)



WISCONSIN Chapter of the AFS held sectional sessions at its meeting Oct. 14 at Hotel Schroeder, Milwaukee. Photos of the meeting are by Walter V. Napp, Badger Firebrick & Supply Co.

Jolt-squeezer molding stations showing that any size Foundry job is a job for Jeffrey.

What JEFFREY Makes:

MOLD CONVEYORS
FLASK FILLERS
AERATORS
SANDITIONERS
PADDLE MIXERS
SCREENS
BIN VALVES
CONVEYORS
BUCKET ELEVATORS

Jeffrey-Equipped means Efficient Operation

A close-up view of a sand preparation plant.

Jeffrey belt conveyor distributing sand to molders' hoppers.

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

907 North Fourth St., Columbus 16, Ohio

Baltimore 1 · Birmingham 3 · Boston 16 · Buffalo 2 · Chicago 1 · Cincinnati 2 · Cleveland 13 · Denver 2 · Detroit 13 · Harlan · Houston 5 · Huntington 19 · Jacksonville · Milwaukee · New York 7 · Philadelphia 3 · Pittsburgh 22 · St. Louis 3 · Salt Lake City 1 · Scranton 3

Complete Line of Material Handling, Processing and Mining Equipment

JM

(*Continued from page* 158)

School; John F. Dix, Austin High School; Paul F. Hoffman and Joseph S. Turek, Tilden Technical High School; R. L. Drdla, Carl Schurz High School; Fred H. Dix, Thomas J. Brown, Charles E. Roland and L. L. Sutherland, Lane Technical High School.

The Steel Division conducted a roundtable on "Molten Steel Temperatures," with Gustaf A. Lillieqvist, research director, American Steel Foundries, East Chicago, Ind., as speaker. Mr. Gregg was chairman.

W. G. Ferrell, general works superintendent, Auto Specialties Mfg. Co., St. Joseph, Mich., was the speaker at the Malleable Division group meeting, and his subject "Conserving Raw Material and Its Best Use." Chairman was Cecil F. Semrau, operating metallurgist, Illinois Malleable Iron Co., Chicago.

The Gray Iron and Pattern Divisions joined forces to hear Fred B. Skeates, foundry superintendent, Link-Belt Co., Chicago, speak on "Pattern Equipment for Nonproductive Purposes." Harry K. Swanson, owner, Swanson Pattern & Model Works, East Chicago, Ind., and Adrian C. Den Breejen, foundry superintendent, Nichol-Straight Foundry Co., Chicago, was co-chairman.

Nonferrous Division conducted a roundtable on "Aluminum Foundry Practice" with Wayne Martin, William F. Jobbins Inc., Aurora, Ill., as speaker. Fred Ridel, H. Kramer & Co., Chicago, was chairman.

When the program committee of the Chicago Chapter announced William T. Bean Jr., research consultant, Detroit, as speaker for the Dec. 5 meeting on the theme "Sound Castings Can Be Designed," it stated that "the subject should appeal to all foundrymen, and may be a bit shocking to some designing engineers."

These predictions were borne out fully in Mr. Bean's presentation. Using his native Oklahoma drawl and wit to excellent advantage, charging his audience with challenging statements, performing convincing demonstrations, displaying several precision instruments for stress analysis, and showing a number of good slides, he developed his theme masterfully.

Mr. Bean's message will not be developed here since it has been abstracted in THE FOUNDRY, the most recent being December, 1949, p. 162.

George K. Dreher, executive vice president, Foundry Educational Foundation, Cleveland, presented a coffee talk in which he outlined some phases of the organization's work and future plans. He mentioned that the foundation is in process of expanding its program by adding five universities and technical schools to the original list of seven.

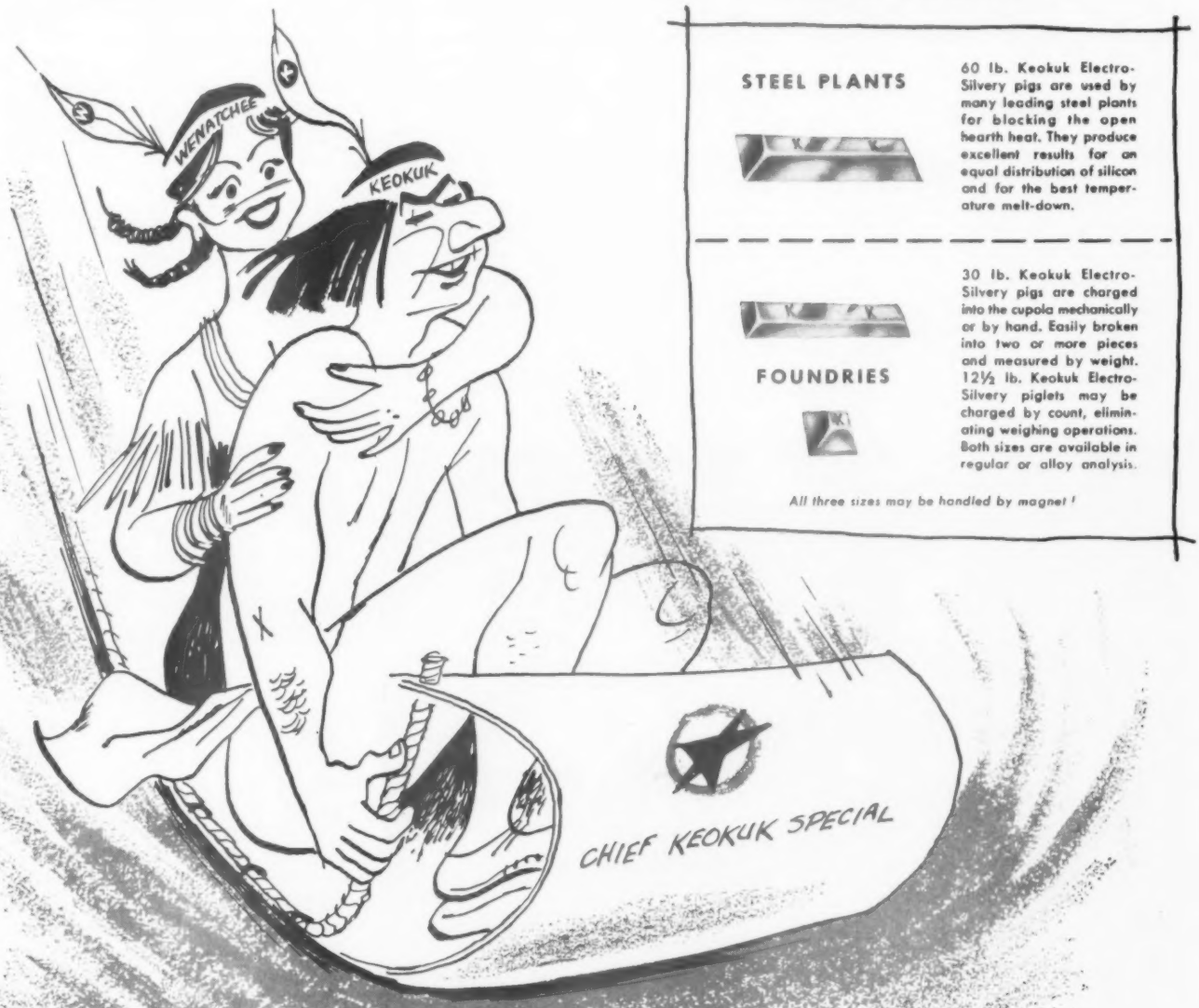
George W. Anselman, foundry superintendent, Woodruff & Edwards Inc., Elgin, Ill., and chairman of the chapter's Educational Committee, announced details of the Foundry Demonstration Course to start in January and continue through March on second and fourth Monday evenings, and invited foundries to enroll their personnel. Sessions will cover sand, molding, core-making, melting and pouring, cleaning of castings, and in-

(*Continued on page* 162)

NORTHERN CALIFORNIA Chapter of the AFS held its annual golf tournament and steak buffet Oct. 14 at Orinda Country Club, Orinda, Calif. Views of the outing show: Fig. 1, left to right—Elgo Sabatini, General Motors Corp., Oakland, Calif., and William E. Butts, Enterprise Engine & Foundry Co., San Francisco; Fig. 2—Chapter President J. L. Francis, Vulcan Steel Foundry Co., Oakland, does a little singing; Fig. 3—William Fletcher and John Bermingham, E. F. Houghton Co., San Francisco; Fig. 4—William McGregor, Columbia Steel Co., San Francisco, carries off his low-gross score prize; Fig. 5—Ed Welch Jr., graduate manager, University of California (left), and Clayton Russell, Phoenix Iron Works Co., Oakland; Fig. 6—Sam Russell, Phoenix Iron Works Co., and Fig. 7—Jay Snyder, Joseph Musto Sons-Keenan Co., Berkeley, Calif., outing committee chairman

Zoom along with Chief Keokuk and his Princess Wenatchee! That's what many foundry and steel plants have been doing for many years . . . because they have found that *Keokuk never lets them down!* This dependability plus the dependability of Keokuk Electro-Silvery with its accurate percentages of silicon, iron and alloys . . and its uniformity in size and weight . . . makes *Keokuk the best buy!*

ZOOM ALONG WITH KEOKUK...



STEEL PLANTS

60 lb. Keokuk Electro-Silvery pigs are used by many leading steel plants for blocking the open hearth heat. They produce excellent results for an equal distribution of silicon and for the best temperature melt-down.

FOUNDRIES

30 lb. Keokuk Electro-Silvery pigs are charged into the cupola mechanically or by hand. Easily broken into two or more pieces and measured by weight. 12½ lb. Keokuk Electro-Silvery piglets may be charged by count, eliminating weighing operations. Both sizes are available in regular or alloy analysis.

All three sizes may be handled by magnet!

KEOKUK
electro-silvery

Keokuk metallurgists can help you with your metal and addition problems. Write to us now for this no obligation service or for complete information on Keokuk Electro-Silvery!

KEOKUK ELECTRO-METALS COMPANY

KEOKUK, IOWA

Wenatchee Division, Wenatchee, Washington

SALES AGENTS

Miller and Company, 332 S. Michigan Avenue, Chicago 4, Illinois
Cincinnati 2, Ohio, 3504 Carew Tower. St. Louis 1, Mo., 407 N. Eighth St.

(*Continued from page* 160)
spection of castings. Emphasis will be placed upon fundamentals, foundry terminology and economic advantage of the foundry as a place to work.

Next meeting of the chapter will be held at the Chicago Bar Association on Tuesday, Jan. 10, a deferment made necessary because first Monday of the month is a holiday. The program will consist of roundtables.

The chapter's annual Ladies' Night party has been set for Saturday, Feb. 18, at the Palmer House.—*Erle F. Ross.*

Pittsburgh

THOMAS E. Barlow, sales manager, Eastern Clay Products, Inc., Jackson, O., addressed the Pittsburgh Foundrymen's Association at its Nov. 21 meeting at the Fort Pitt Hotel, Pittsburgh. His talk covered development of a new method of applying refractory materials to melting furnaces. The process is described as air placement since the materials are handled and transported entirely by air and are mixed with water at the point of placement and thrown against the refractory wall with considerable force through use of 55 to 65 psi air pressure. Most of the applications to date have been in cupolas.

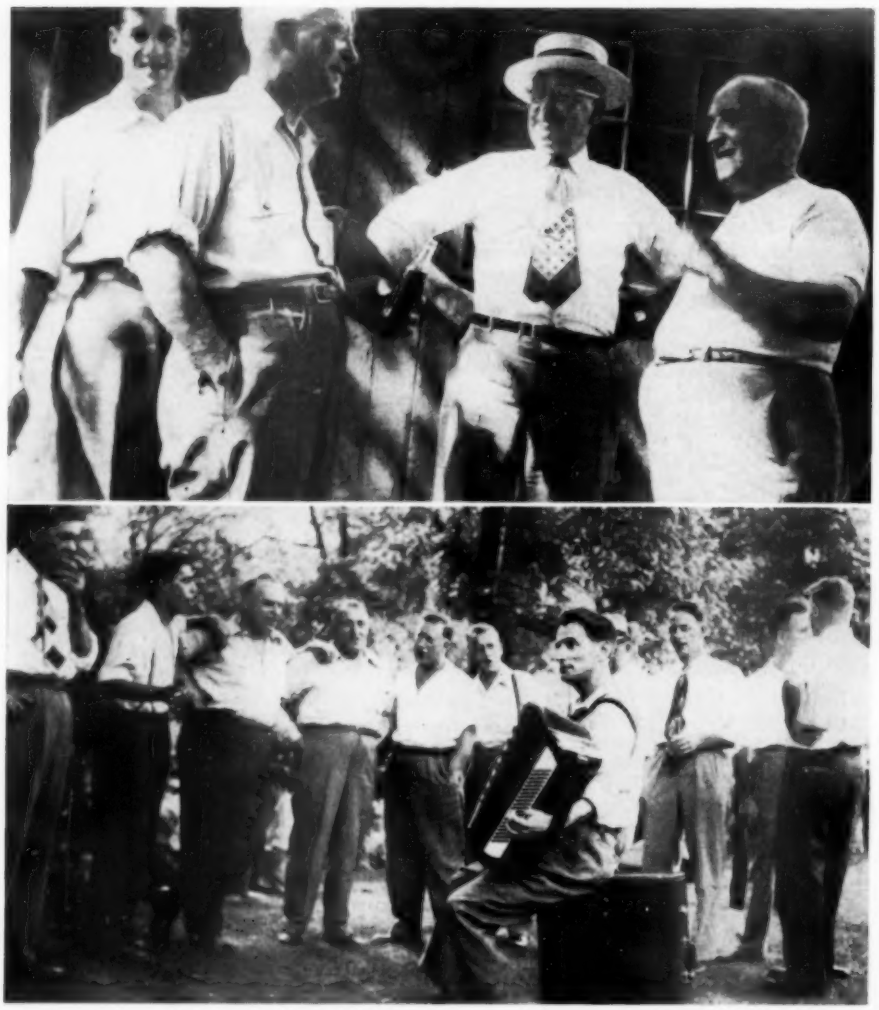
After discussing briefly the obvious advantages of monolithic materials for patching furnaces requiring changes of contour and thicknesses of material ranging from a feather edge up to 14 and 15 inches, Mr. Barlow pointed out that such monolithic materials have been hindered in the past because of the high moisture content and high clay count necessary for working by hand. Consequently such patching materials are not normally used in thicknesses greater than 3 inches because spalling, cracking and chipping result. Ir. addition hand working involves considerable skill. Air placement equipment eliminates variations in the human element and permits use of extremely low moisture and clay contents in the monolithic material.

With this equipment a hard, firm patch can be applied with approximately 18 to 22 per cent clay, compared with 33 to 35 per cent for hand operations and 7 to 7½ per cent moisture, compared with 12 to 18 per cent by hand. The patch is said to give much better refractory life in service. Particularly noticeable is the reduction in bridging tendencies, frequently the result of poor patching.

The best combinations of dry materials range between the theoretical maximum of 60 per cent coarse and 40 per cent fine and the theoretical minimum of a wide distribution over the middle grades of sizes. Present combinations are on the order of 42 per cent coarse material, 13 per cent medium and the remainder fines. This gives maximum density comparable with sufficient permeability to dry out the lining without spalling or cracking.

The talk emphasized the necessity of using well graded, high refractory ganisters, preferably of the rounded grain size, together with a graded silica material for the fine section and highly refractory, plastic fire clay.

In addition to cupola linings, the equipment has been used successfully for increasing the refractory life of electric furnace roofs, side walls and air furnace roofs and side walls, primarily to keep the refractories in good repair and prolong their life.—*Joseph C. Sullivan.*



ONTARIO Chapter of the AFS held its picnic on Aug. 27. Photos are by courtesy of Ted Robinson, Bertrams, Ltd.

Washington

PRESENTATION of the film, "Fluid Flow in Transparent Molds," was made by S. C. Massari, technical director of the American Foundrymen's Society at the Oct. 21 meeting of the Washington Chapter of the AFS held at the Gowman Hotel, Seattle.

A fluid consisting of water in which aluminum powder was suspended was used to simulate metal flow in transparent lucite molds. Under conditions of the experiment the behavior of this fluid compares with that of metal. The mold was perforated to simulate the permeability in an actual sand mold and these holes could be opened or closed at will to indicate where positive or negative pressures exist in the gating system.

The pouring box is essential on larger castings to insure getting the metal into the mold cavity free of dross, dirt and entrapped air. It was shown that sharp corners anywhere in the gating system, and especially at the lip of the down sprue at the

(*Continued on page* 164)

Smith L-O Core Oil
A First Step to Better Cores
Your control and our control result in castings your customers can depend upon.
You, as a producer of castings, know the importance of control in your foundry.
We, as a manufacturer of core oil, also appreciate the
MOLDED TO PERFECTION
SAND is only part of the picture

vital part core oil performs in maintaining that all-important control.

SMITH L-O CORE OIL is compounded in numerous grades to suit your specific needs . . . then each is carefully processed by the Dow-Therm indirect fire method. This, specifically, is where our greatest control lies. This method enables us to maintain exact consistency, uniformity, and homogeneity every time. It assures a more satisfactory sand mix . . . and you can depend on that whether forming large or small cores.

Whether you do jobbing or production work, team up with SMITH L-O CORE OIL—a first step to better cores.

Smith L-O Core Oil

WAREHOUSE STOCKS AVAILABLE
In The Following Cities

- COLUMBIAN WAREHOUSE CO. — Reading, Pennsylvania
- FOUNDRY SERVICE CO. — Birmingham, Alabama
- E. R. FROST CO. — Minneapolis, Minnesota
- MARKET TERMINAL WAREHOUSE — Buffalo 4, New York
- MALCOLM G. STEVENS — Arlington, Massachusetts
- TERMINAL WAREHOUSE — Worcester 8, Massachusetts
- M. W. WARREN COKE CO. — St. Louis, Missouri
- WESTERN FOUNDRY SAND CO. — Seattle, Washington
- WESTERN INDUSTRIAL SUPPLY CO. — Portland 14, Oregon

Smith L-O Core Oil

CORE WASH ROD DIP LIQUID PARTING

SMITH OIL & REFINING CO
MANUFACTURERS OF L-O AND CERTIFIED CORE OILS
INDUSTRIAL OILS DIVISION . . . ROCKFORD, ILLINOIS

(*Continued from page* 162)

pouring basin, tend to cause turbulence and air bubbles. Rounding of corners promoted quiet flow and eliminated air bubbles. Also it has been established by this research that a definite relationship exists between area of sprue, runner and gate for given mold pouring speeds which will allow the metal to fill the mold cavity without turbulence. The transparent mold is a tool which will enable the research group to find the ratios which give best results. Then by correlation the data may be applied to actual gating systems using metal and sand molds.

Announcement was made of tentative plans to hold a Northwest regional conference in October, 1950, the conference and technical sessions to be held at the University of Washington and sponsored jointly by the Washington, Oregon and British Columbia chapters.—*Harold R. Wolfer, Puget Sound Naval Shipyard.*

Northeastern Ohio

EXCELLENT turnout marked the regular meeting of Northeastern Ohio Chapter of the AFS, held at Tudor Arms Hotel, Cleveland, on Nov. 10. Richard G. McElwee, Vanadium Corp. of America, Detroit, spoke on "Application of Research to the Foundry Industry," and his discussion was followed by presentation of the Malleable Founders' Society's motion picture "This Moving World."

A. A. Hilbron, convention and exhibits manager of the AFS, made a brief announcement concerning the AFS convention and show to be held in Cleveland, May 8 to 12.

Mr. McElwee pointed out that while the term "research" usually brings to mind technicians and laboratories with a large assortment of expensive equipment, to his mind it means finding the cause of any effect; for example, what causes a certain type of defect in a casting?

On that basis every foundry should have a research program, for it is important to be able to eliminate losses due to defects and other causes. However, one of the major obstacles in the effective application of a research program is managements' reluctance to allow any activity to interfere with a planned production schedule. Yet it would seem to be unsound policy to operate with a 14 per cent loss, for example, when research for the cause of that loss in the midst of production activity might bring the loss down to reasonable limits.

He pointed out that someone not associated with production can determine causes of trouble quickly because he has an unbiased viewpoint. Mr. McElwee urged that complete and accurate records be kept on various operations so that they can be checked when trouble arises. He also stated that foundries should sell the engineering properties of the product rather than so many pounds of castings.

In emphasizing the importance of slag composition as a factor in cupola control, Mr. McElwee stated that the AFS cupola research committee is available to assist foundries in problems connected with slag.

The speaker concluded his talk with a brief discussion of nodular iron. While expressing the opinion that potentialities of this material are tremendous, he recommended that any foundry not prepared to spend time and money in developing its practices for production of such castings should not consider it as a product. The purveyor of nodular iron castings requires not only research talent to make them but also engineers capable of selling the metal's properties.

The patternmakers group held a panel discussion. Questions for the discussion were submitted by apprentices in trade schools and shops from the local area. Apprentices were invited to attend the session.

(*Continued on page* 166)

SAGINAW VALLEY Chapter of the AFS held its suppliers' night Nov. 3 at Fischer Hotel, Frankenmuth, Mich. At top, left to right, are: Edward McFaul, Mid-West Institute, Chicago, principal speaker, and Lyle L. Clark, Buick Motor Division, General Motors Corp., Flint, Mich., chapter chairman

Ask the men in the machine Shop--

ARE CASTINGS BETTER?

THEY'LL TELL YOU they've handled thousands of castings but the new lot beats them all. Never before was machining so easy, smooth and fast.

THEY ARE GREATLY RELIEVED of trouble and slow-downs caused by chilled sides, hollow centers and hard spots in castings.

You SHOULD INVESTIGATE Famous CORNELL CUPOLA FLUX

IT IMPROVES CASTING structure by removing slag and other impurities from molten metal and reducing sulphur.

IT MAKES METAL HOTTER AND FREER FLOWING. You pour castings that are unusually sound, even in grain, and reduce rejects.

IT KEEPS CUPOLAS CLEANER, saving time and labor in maintenance.

AND THE COST IS SO SMALL it is forgotten when you see the big returns from the investment.

A TRIAL IS CONVINCING.

Write for Bulletin 46-B

MALLEABLE FOUNDRIES, with cupola operation, are showing a rapid trend towards the use of Famous Cornell Cupola Flux. Reports of greatly improved casting production come from every direction. Furthermore, there is a considerable reduction in cupola maintenance labor and cost. The life of cupola lining, whether brick or stone, is greatly prolonged.

EXCLUSIVE SCORED BRICK FORM

TAKES PRACTICALLY NO TIME TO USE— only a few seconds, that's all. You simply lift this pre-measured flux from container and toss it into cupola with each ton charge of iron. For smaller charges, simply break off one to three briquettes (quarter sections) as per instructions.

The CLEVELAND FLUX *Company*

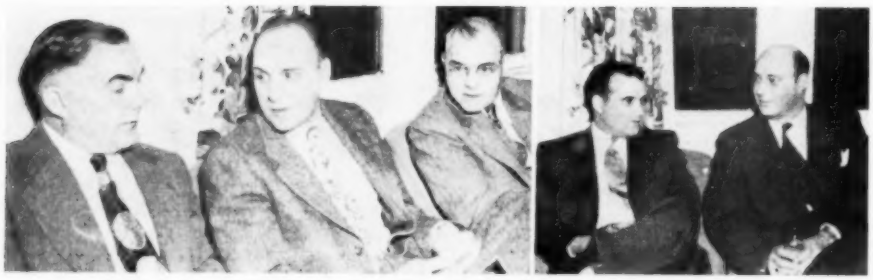
1026-1036 MAIN AVENUE, N.W., CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

FAMOUS CORNELL FLUXES
Trade Mark Registered

Write for Bulletins

Famous CORNELL ALUMINUM FLUX	*Famous* CORNELL BRASS FLUX	*Famous* CORNELL LADLE FLUX
Produces clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections are poured. Castings take a higher polish. NO FUMES! Exclusive formula prevents obnoxious gases. Metal does not cling to dross.	Makes metal pure and clean, even when dirtiest brass turnings or sweepings are used. Produces castings which withstand high pressure tests and take a beautiful finish. Saves considerable tin and other expensive metals. Crucible and furnace linings are preserved.	Place a few ounces in bottom of ladle, then tap cupola. Metal is thoroughly cleansed, foreign impurities are easily skimmed off. Ladles are kept clean, there is less patching and increased ladle life. Metal temperatures are retained during transfer to molds.



NO. ILLINOIS & SO. WISCONSIN Chapter of the AFS held its Nov. 8 meeting at the Beloit Country Club, Beloit, Wis. Shown above, left to right, are: Raymond Stenstrom, Harry Swenso, and Milton Stone, Greenlee Bros. & Co., Rockford, Ill.; N. Segalla, Gunite Foundries Corp., Rockford, and Carl L. Petty Jr., A. P. Green Fire Brick Co., Mexico, Mo. Photos are by courtesy of Jerry M. Zilka, Gunite Foundries Corp.

(*Continued from page* 164)

Peter Rettig, Rettig Pattern Works, Cleveland, was panel chairman. Panel members included Carl Winkler, Cleveland Standard Pattern Works; Theodore Able, Advance Pattern Co.; Harry Schutt, Schutt Pattern Works, and Edward Glosner, Modern Pattern Co., all of Cleveland.—*Edwin Bremer and Robert H. Herrmann.*

Tennessee

TOPIC of discussion at the Oct. 28 meeting of Tennessee Chapter of the AFS, held at Hotel Patten, Chattanooga, Tenn., was "Permanent Mold Castings." Howard Wilder, chief metallurgist, Foundry Division, Eaton Mfg. Co., Vassar, Mich., was the speaker, and he was introduced by Paul Arnold, U. S. Pipe & Foundry Co., Chattanooga, chapter vice chairman.

Mr. Wilder said that permanent molding probably dates back to 3000 BC and that men used molds cut out of stone, pouring their metal into them as it melted from ore-bearing stones in their fires. First satisfactory iron permanent mold castings made in the United States were carburetor parts for Model T Fords produced about 1920.

The speaker described operation of the company's permanent mold iron casting machines, and discussed sodium silicate mold coating which is brushed or sprayed on the molds at a temperature of 450° F. Cores used in permanent mold operations are soft and permeable, and are dipped in a solution of graphite. They are held in the molds with special hangers.

The advantages of permanent mold gray iron castings, according to the speaker, are their free machinability due to an absence of scale, uniform structure, dimensional accuracy, dense structure, close tolerances, and ability to take a high finish. However, the process is limited to production of relatively small castings. —*Carl A. Fischer Jr., Fischer Supply Co.*

No. Illinois and So. Wisconsin

MORE than 100 members and guests attended the dinner meeting of Northern Illinois-Southern Wisconsin Chapter of the AFS held Nov. 8 at the Beloit Country Club, Beloit, Wis. William Ball Jr., metallurgist and foundry consultant, R. Lavin & Sons Inc., Chicago, spoke on "The Effective Essentials Required in Making a Casting."

Mr. Ball expressed the conviction that the foundry industry is one of the most important in the world. In Mr. Ball's estimation the foundryman's life is a balance of three "M's" —materials, machines and men. Many foundrymen have kept abreast of the changes that have taken place with materials and machines. It is now necessary for the foundryman to train himself to keep abreast with the changes in dealing with men.—*Jerry M. Zilka, Gunite Foundries Corp.*

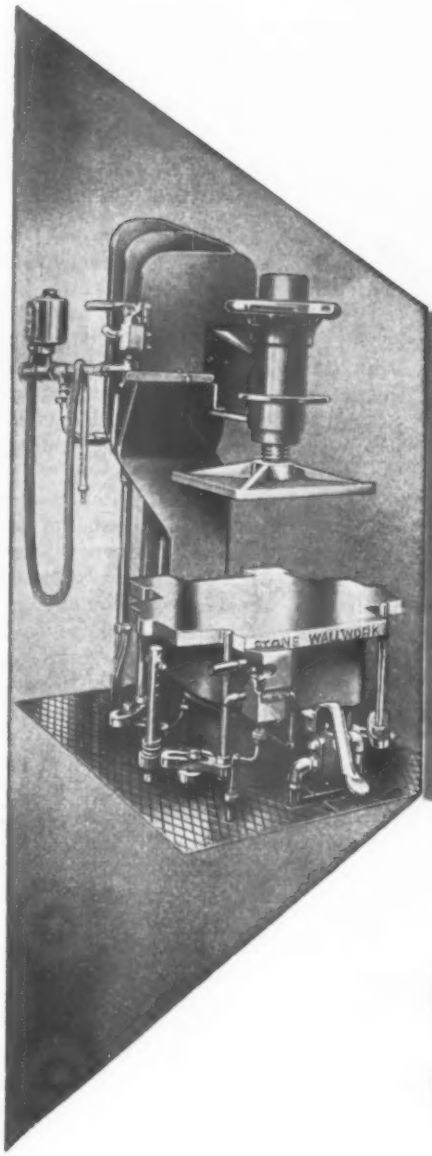
New Jersey

H. L. EDINGER, Barnett Foundry & Machine Co., Irvington, N. J., has been re-elected president of the New Jersey Foundrymen's Association. A. E. Winstead, Moore Bros. Co., Elizabeth, has been named vice president, to succeed E. B. Smith, American Brake Shoe Co., New York. John L. Carter and J. A. Williamson, both of Newark, N. J., have been re-elected secretary and treasurer, respectively.

Elections followed the first regular fall dinner meeting of the association at the Military Park Hotel, Newark, Oct. 17.

(*Continued on page* 168)

NORTHEASTERN OHIO: Views of the Oct. 13 meeting of Northeastern Ohio Chapter of the AFS at Tudor Arms Hotel, Cleveland. Photos by Sterling N. Farmer, Sand Products Corp.



JOLT + SQUEEZE *Simultaneously!*

BIG NEWS!!

MOLDING MACHINES

PRODUCING ROCK-HARD MOLDS

Stone-Wallwork presents to the U.S.A. a different range of molding machines of outstanding interest, incorporating their simultaneous jolt squeeze action.

FEATURES YOU CANNOT IGNORE

1. **Simultaneous Jolt Squeezing — this consists of jolting on the upward squeeze stroke and also whilst squeezing is taking place.**
2. **Independent Jolting and Squeezing actions can be operated if necessary.**
3. **The most speedy machine on the market.**
4. **The greatest density of ramming.**
5. **Pin lift and turnover type machines, supplied in a range of sizes up to a maximum useful load of 1,500 lbs.**

Stone-Wallwork equipment operates in 18 different countries.

The range of products include complete mechanised plants, Push Button Controlled Molding Machines, and a special range of machines for operating in conjunction with the sand-slinger unit.

MADE IN ENGLAND

STONE-WALLWORK *Foundry Equipment*

STONE-WALLWORK LIMITED, 157, VICTORIA STREET, LONDON, ENGLAND

CANTON DISTRICT Chapter of the AFS met at the Elk's Club, Alliance, O., Nov. 3. Participants in the program are shown above. Front row, left to right, are: George M. Biggert, United Engineering & Foundry Co., Canton, O., chapter chairman, and Paul Ebert, personnel director, Ohio Boxboard Co., Rittman, O., coffee speaker. Back row, left to right, are: Harold Biddinger and Edward F. Kipp, F. E. Myers Co., Ashland, O.; M. G. Winters, Winters Foundry Co., Canton; Ernest Lancashire, Union Metal Mfg. Co., Canton and R. E. Mittlestead, Electromelt Co., Barberton, O.

(*Continued from page* 166)

H. P. Good, foundry manager, Textile Machine Works, Reading, Pa., and president, Gray Iron Founders Society Inc., was the featured speaker at the meeting. He outlined the modernization program conducted at his foundry over the past year and discussed various aspects of foundry management which might prove instrumental in reducing casting costs.

Principal features of his company's modernization program, he said, included two flexible mold conveyor units, complete sand handling; new inside storage and crane facilities for handling pig iron, scrap and coke; mechanical charging equipment; and a briquetting machine for salvaging borings.

Six directors were elected for three-year terms: W. I. Abrams, Atlas Foundry Co., Irvington; G. W. Hannay, Barnett Foundry & Machine Co.; A. W. Laytham, William P. Laytham & Sons Co., Paterson, N. J.; E. B. Smith; Max Traum, Sacks-Barlow Foundries Inc., Newark; and H. A. Vreeland, North Jersey Foundry Co., Little Falls, N. J.—*Ben K. Price.*

TEXAS Chapter of the AFS met Nov. 18 at the Dallas Athletic Club, Dallas. Shown above, left to right, are: W. H. Lyne II, Hughes Tool Co., Houston, chapter vice chairman; Clyde A. Sanders, American Colloid Co., Chicago, principal speaker; C. R. McGrail, Texaloy Foundry Co., San Antonio, chapter chairman, and Charles Sibbett, Refinery Castings Co., Dallas. Photos courtesy of C. E. Silver, Texas Electric Steel Co., Houston

Canton

ROUNDTABLE discussions on steel, cast iron, patterns and nonferrous metals were featured by Canton District Chapter of the AFS at its Nov. 3 meeting held at the Elks Club, Alliance, O. Seventy-five members and guests were present and George M. Biggert, United Engineering & Foundry Co., Canton, O., chapter chairman presided.

A coffee talk given by Paul Ebert, personnel director, Ohio Boxboard Co., Rittman, O., was entitled "Know Yourself." Mr. Ebert, an ordained Lutheran minister, gave many interesting stories that proved to be of good homespun humor and crammed with philosophy and down-to-earth logic.

Thomas W. Harvey, Pitcairn Co., Barberton, O., chapter program director, introduced the leaders of the roundtable discussions: Steel, R. E. Mittlestead, Electromelt Casting Co., Barberton, O.; cast iron, Ernest Lancashire, Union Metal Mfg. Co., Canton, O.; patterns, Harold Biddinger and Edward F. Kipp, both of F. E. Myers Co., Ashland, O.; nonferrous metals, M. G. Winters, Winters Foundry Co., Canton, O.—*Alexander Prentice, Stark Foundry Co.*

Texas

AT the Nov. 18 meeting of Texas Chapter of the AFS, held at the Dallas Athletic Club, Dallas, Tex., Charles R. McGrail, Texaloy Foundry Co., San Antonio, Tex., welcomed the 75 members and guests and turned the meeting over to W. H. Lyne II, Hughes Tool Co., Tex., vice chairman and program director. He introduced Clyde A. Sanders, American Colloid Co., Chicago, whose talk on "Foundry Sand Practice" created a lively discussion.—*E. P. Clarke, American Wheelabrator & Equipment Co.*

Detroit

ANNUAL father and son meeting of Detroit Chapter of the AFS was held Nov. 17 at the Ford Motor Co., with approximately 440 in attendance. Representing the Ford company at the speakers' table were F. C. Riecks, manager of foundries and national director of the AFS; Gosta Vennerholm, manager of research; E.

(*Continued on page* 170)

IT isn't a matter of just being "scotch", like the lassie here — it's just plain thr-r-rifty to change over to Annealshot, the heat-treated, longer-lasting shot and grit.

METAL BLAST, INC.

872 East 67th St. • Cleveland 3, Ohio

EXPRESS 4277

ANNEALSHOT is uniformly round, solid shot —no rough edges, no "tails", no hollow shot.

Photo courtesy of Gantner of California

ANNEALSHOT by Metal Blast

(*Continued from page* 168)

C. Jeter, manager production foundries; and H. N. Bogart, supervisor of ferrous research.

Mr. Riecks welcomed those present and stated that the Ford Motor Co. was pleased to have the privilege of entertaining so many foundrymen and their sons. A short movie depicting foundry operations not conveniently seen on the tour was shown and groups of about 30 embarked by bus to the foundry. Each group was led by a qualified guide.

Ford is unique in the fact that motor blocks are poured using iron direct from the blast furnace, blended with cupola iron and processed through a direct arc electric furnace into a holding furnace. Other Ford exclusives are the casting of crankshafts using stack cores and their method of assembling the motor block cores; dipping the whole assembly into a bath of wash then spinning the inverted assembly to remove excess wash prior to drying.

The tour, which required about two hours, gave a full-scale picture of a highly developed mechanized foundry from molten metal to the machine shop and was impressive to those acqainted with the foundry as well as to the young guests.—*Julian N. Phelps, Vanadium Corp. of America.*

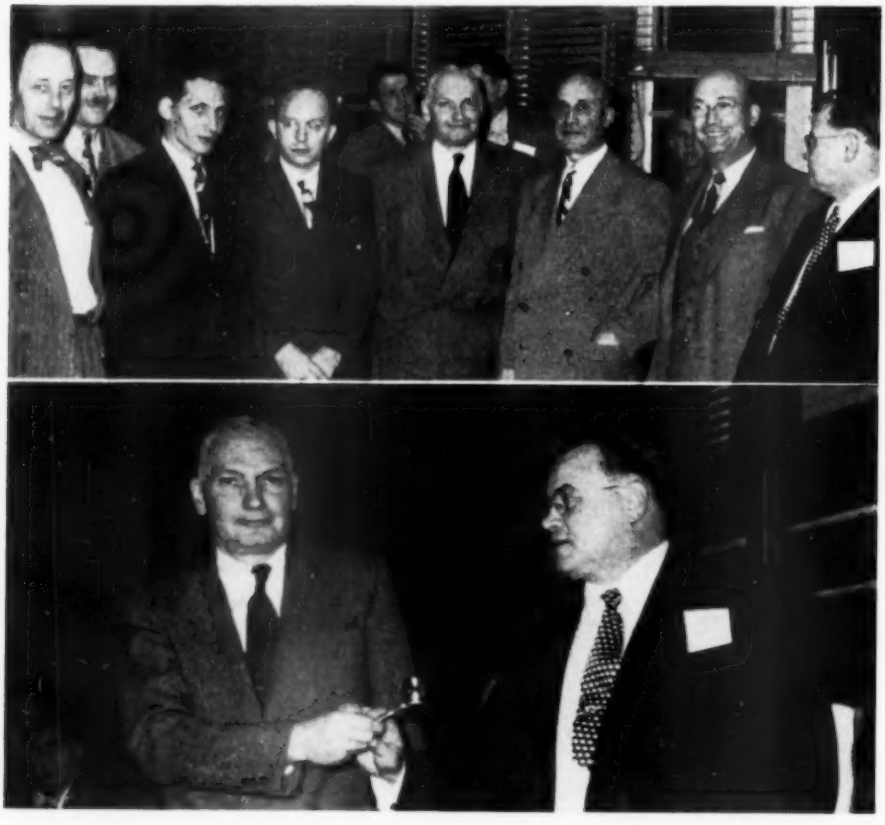
Northwestern Pennsylvania

APPROPRIATE to the ending of the current football season, Tom Barlow, Eastern Clay Products Inc., Jackson, O., chose for his subject, "Let's Kick It Around," at the Nov. 28 meeting of Northwestern Chapter of the AFS held at the Moose Club, Erie, Pa. About 100 members were present and Chairman Joseph Shuffstall, National - Erie Corp., Erie, presided.

Subjects discussed were: Flowability of core sands; core infiltration; troublesome molding sands; and importance of patching a cupola. Each subject was introduced by Mr. Barlow, and S. F. Yoculan, American Sterilizer Co., Erie, served as discussion leader. On flowability of core sands, the speaker said that this phase of foundry operations is becoming more prominent each day. Little attention and knowledge of it has prevailed to date, but with extensive use of core machines, correct mixtures of sand to give good flowability are necessary to assure good, smooth, sound castings.

Referring to core sand infiltration into molding sands, Mr. Barlow stated that, due to different screen tests of core and molding sands, trouble can arise overnight if the proper measure of introducing balancing ingredients is not adhered to. Molding sand problems start in the coreroom and troublesome sands cannot be cured by all the sand testing equipment in existence if results are not used instead of being filed. He stated that there is considerable difference between sand testing and sand control.

A special meeting will be held Jan. 6 in Grove City, Pa., at the Penn Grove Hotel. Douglas James, foundry superintendent, Cooper-Bessemer Co., Grove City, will be chairman and William H. Moore, Meehanite Metal Corp., will discuss "Synthetic vs. Natural Bonded Sand." On Jan. 23, Fred Sefing, International Nickel Co., New York will speak at the chapter's regular meeting at the Moose Club, Erie.—*Earl M. Strick, Erie Malleable Iron Co.*



DETROIT Chapter of the AFS held its annual father and son night Nov. 17. Shown at the meeting, top view, left to right, are: Gosta Vennerholm, Ford Motor Co.; J. N. Phelps, Vanadium Corp. of America, chapter secretary; E. J. Passman, Frederic B. Stevens Inc., chapter treasurer; Jess Toth, Harry W. Dietert Co., chapter vice chairman; R. J. Wilcox, Michigan Steel Casting Co., chapter chairman; Frank Reicks and E. C. Jeter, Ford Motor Co., and A. W. Stolzenburg, Aluminum Co. of America, retiring chapter chairman. In lower photo Mr. Wilcox (left) officially receives the gavel from his predecessor, Mr. Stolzenburg, at an earlier meeting

Eastern New York

A DEMONSTRATION and talk on "Modern Techniques in Plastic Pattern Making," by Franz Schumacker, chief patternmaker, Cooper Alloy Foundry Co., Hillside, N. J., featured the technical session at the Nov. 15 meeting of Eastern New York Chapter of the AFS held at Circle Inn., Lathams, N. Y.

An authority on the subject of plastic patterns, Mr. Schumacker demonstrated some of the techniques which he has developed in making that type of pattern equipment. In addition he had with him a large selection of plastic patterns for examination and discussion.—*G. Danner, American Locomotive Co.*

New England

DISCUSSION of "Electronic Baking of Cores" was presented by John R. Crotty, assistant director of research, Crompton & Knowles Loom Works, Worcester, Mass., at the Nov. 9 meeting of the New England Foundrymen's Association. Approximately 100 members were present and Frederick M. Fitzgerald, Draper Corp., Hopedale, Mass., who is president of the association, presided. Following a business meeting, there was

(*Continued on page* 172)

STARRBIDE

CARBON BONDED SILICON CARBIDE CRUCIBLES

★ *NEW* SCIENTIFIC DESIGN ELIMINATES OLD STYLE HEAVY WALLS

CONVENTIONAL CRUCIBLE HAS THIS CAPACITY
STARRBIDE'S NEW THIN WALL DESIGN GIVES ALL THIS ADDED CAPACITY
AMERICAN CRUCIBLES

★ **STARRBIDE CRUCIBLES** produce more metal per furnace per day.

★ **STARRBIDE CRUCIBLES** provide more metal per heat.

★ **STARRBIDE CRUCIBLES** melt metal faster.

★ **STARRBIDE CRUCIBLES** cut fuel costs per pound of metal melted.

Information on savings you can accomplish using STARRBIDE CRUCIBLES is obtainable in a new brochure. Write for it.

STANDARD SHAPE STARRBIDE

No.	Approx. Working Capacity in lbs. Red Brass	Approx. Level Full Capacity Lbs. Water	Approx. Working Capacity in lbs. Red Brass	Approx. Level Full Capacity Lbs. Water
50	179.	24.	206	26.3
60	209.	28.	241	32.1
70	239.	32.	268	36.3
80	269.	36.	298	40.1
90	298.	40.	328	45.5
100	328.	44.	361	49.
125	373.	50.	405	53.6
150	468.	60.	480	61.7

MAIL THIS COUPON NOW FOR YOUR COPY OF THE STARRBIDE BULLETIN

AMERICAN CRUCIBLE COMPANY
NORTH HAVEN, CONNECTICUT

Gentlemen:

Please send STARRBIDE Bulletin

Firm _____

Signed By _____

Address _____

City & State _____

AMERICAN CRUCIBLE CO., NORTH HAVEN, CONN.

(*Continued from page* 170)
a brief moment of silence in memory of Francis LeBaron, a past president of the association and president, E. L. LeBaron Foundry Co., Brockton, Mass., who died Sept. 26.

In this paper, Mr. Crotty described in detail the electronic core baking installation at his foundry and the process employed.—*Walter M. Saunders Jr.*

Providence Non-Ferrous

A TALK entitled "Some Bronze Casting Defects" was presented by R. A. Colton, research metallurgist, Federated Metals Division, American Smelting & Refining Co., before the Providence Chapter of the Non-Ferrous Founders' Society, Nov. 3.

Mr. Colton passed around several defective bronze castings after which each person was asked to list on a prepared form the causes of the defects. The speaker collated and announced the results of the analysis, following which he discussed the defects at some length.

Julius Ferrari, Gorham Mfg. Co., Providence, R. I., was chairman of the meeting.

Chesapeake

A varied program was arranged for the Oct. 28 meeting of Chesapeake Chapter of the AFS held at the Engineers Club, Baltimore. The assistant superintendent of schools in Baltimore first described plans for a foundry in the new vocational schools which will be completed within two years. A color movie of historic and scenic Maryland was shown after which those present divided into three roundtable discussion groups.

The gray iron roundtable was presided over by Clyde Frear, Bureau of Ships, Washington. Discussion started with accounts of experiences in making ductile cast iron and continued with discussion of such cupola practices as building the bed, electric lighting, hot blast and use of oxygen.

C. A. Robeck, Gibson & Kirk Co., Baltimore, led the discussion at the nonferrous roundtable, at which ideas were exchanged on the cause and cure for dross in 80-10-10 castings and gas porosity in other nonferrous alloys.

Heading the steel roundtable was Harold F. Bishop, Naval Research Laboratory, Washington, who reviewed some of his work in studying the feeding range of steel risers. Further discussion centered around methods of keeping risers open to promote better feeding.—*Jack H. Schaum, National Bureau of Standards and George L. Webster, Baltimore Polytechnic Institute.*

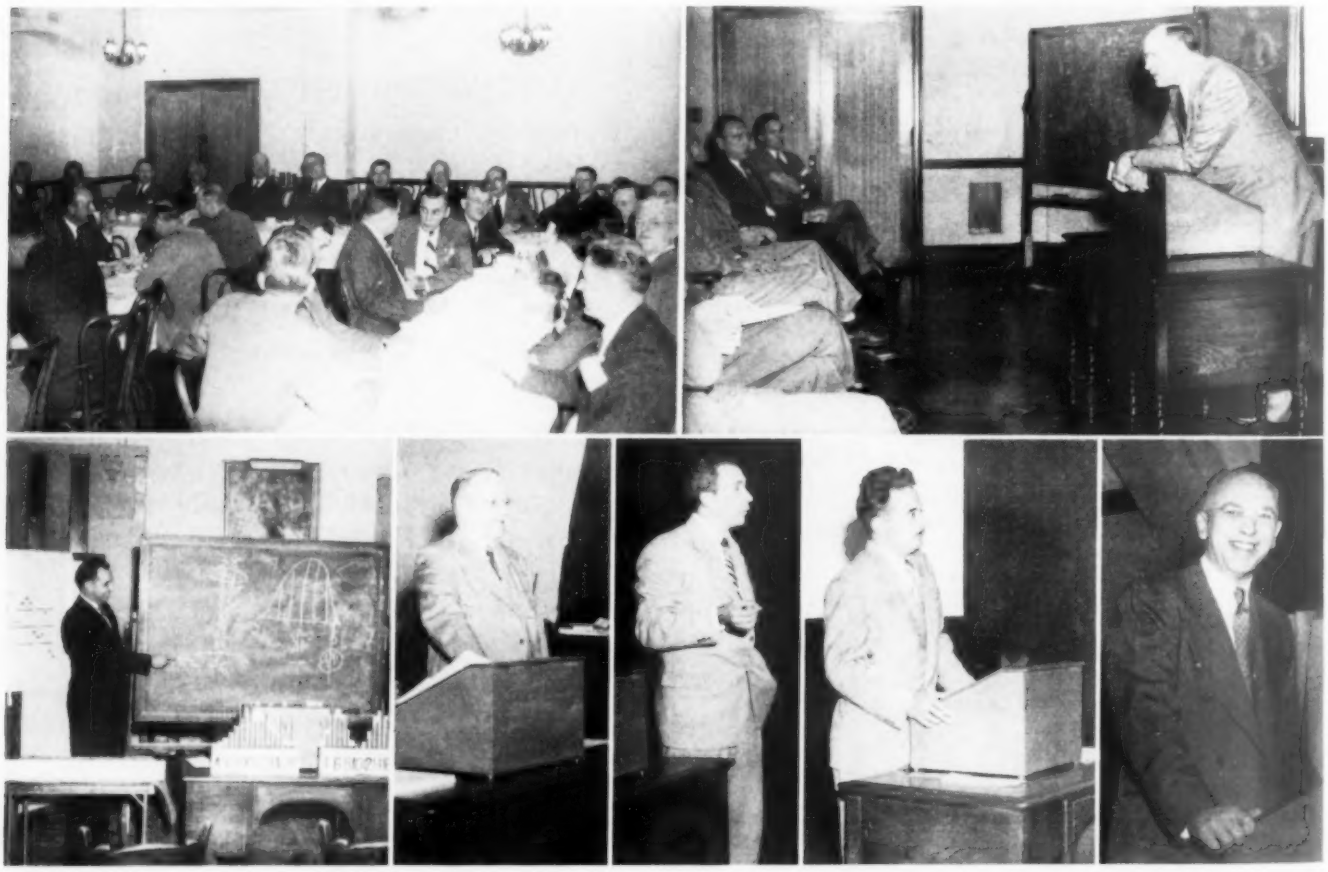
British Columbia

MEMBERS of the Personnel Managers Association, the metal trades section of the Canadian Manufacturers Association, met with the British Columbia Chapter of the AFS on Nov. 22 to hear Ralph L. Lee, General Motors Corp., Detroit, and a regular contributor to THE FOUNDRY. Mr. Lee's topic was "Man to Man on the Job."

A special guest at the meeting was Robert W. Gregg, Reliance Regulator Co., Alhambra, Calif., who is a director of the AFS. Fred R. Young, E. A. Wilcox Co., Seattle, secretary of the Washington Chapter of the AFS, also was present.

The chapter recently completed its first educational course. Subjects covered were: Mechanical testing of metals; gray cast iron; malleable cast iron; cast steel; aluminum alloys.

(*Continued on page* 175)



PURDUE FOUNDRY CONFERENCE: Views of some of the speakers and one of the luncheons at the second annual Metal Casting Conference, Purdue University, West Lafayette, Ind., Nov. 3-4. Photos are by courtesy of Wilfred H. White, Jackson Iron & Steel Co.

AUTHORIZED BS&B DISTRIBUTOR

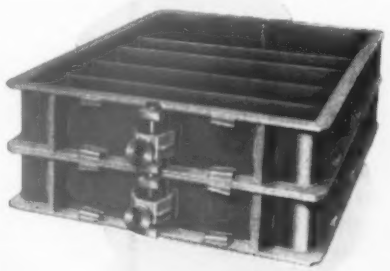
Are You Getting the PRECISION *in Your Casting that Brings* STEADY PROFITS?

Two sure ways to increase the profits of your foundry are stepped-up production and lowered costs. Their light weight make Black, Sivalls & Bryson Foundry Flasks easier to handle. They are a ready aid in saving sand and preventing re-runs. The unusual strength of their welded steel construction insures long, accurate service under most rugged shop conditions.

BS&B Foundry Flasks

are built to insure accurate performance

Foundry men with a background of long years of experience make BS&B Foundry Flasks. They know that flasks are precision tools . . . and must be made by precision methods. BS&B originated the welded steel flask . . . pioneered the steel-bushed flask. The huge BS&B factory with its skilled craftsmen and the most modern equipment is ready to carry out your specifications.



One to Three Week Delivery . . . Get Your Order in Now!

Any shape, any size flask for any purpose, with any combination of fittings . . . built to your order by men who know the foundry! See your nearest BS&B Distributor, or send coupon today to Special Products Division, Section FF10, Black, Sivalls & Bryson, Inc., Power and Light Bldg., Kansas City 6. Mo.

AUTHORIZED BS&B DISTRIBUTORS

BIRMINGHAM, ALA.
Foundry Service Co.

BOSTON, MASS.
Klein-Farris Co., Inc.

BUFFALO, N. Y.
Queen City Sand & Supply Co.

CHICAGO, ILL.
S. Obermayer Co.

CINCINNATI, OHIO
S. Obermayer Co.

CLEVELAND, OHIO
C. L. Nash

DAYTON, OHIO
Fenton Foundry Sup. Co.

DETROIT, MICH.
Wolverine Foundry Sup. Co.
E. J. Woodison Co.

EDWARDSVILLE, ILL.
Midwest Foundry Sup. Co.

ELMIRA, N. Y.
F. F. Shortsleeve Co.

FT. WORTH, TEX.
Ralph A. Carlson

LOS ANGELES, CALIF.
Independent Foundry Sup. Co.

MINNEAPOLIS, MINN.
Foundry Supply Co., Inc.

MONTREAL, CAN.
Canadian Foundry Sup. & Eqpt., Ltd.

OAKLAND, CALIF.
Pacific Graphite Co., Inc.

PHILADELPHIA, PA.
Pennsylvania Foundry Sup. & Sand Co.

PITTSBURGH, PA.
S. Obermayer Co.

ST. LOUIS, MO.
M. A. Bell Co.

TORONTO, CAN.
Canadian Foundry Sup. & Eqpt., Ltd.

BS&B FOUNDRY FLASKS

MAIL THIS COUPON TODAY

Special Products Div., Section FF10, BLACK, SIVALLS & BRYSON, INC.
Power and Light Building, Kansas City 6, Missouri

☐ Send latest facts and figures concerning BS&B All-Steel Welded Foundry Flasks.

☐ Please arrange to have Sales Representative call.

NAME _____

FIRM _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

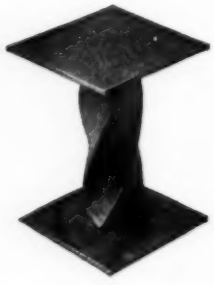
Federal FOUNDRY EQUIPMENT

CLIMAX WIRE STRAIGHTENERS

Any foundry, large or small, can cut production costs by straightening and reusing core wires and rods. With a Climax Wire Straightener this can be done quickly, economically, safely—by unskilled labor. A complete descriptive circular is yours for the asking.

FOLLOW THE FEDERAL LINE

The products on this page represent three of the many items which Federal supplies to the foundry trade. Altogether we have more than 400 different foundry products. Rely on The Federal Foundry Supply Company for your needs.



TWISTED STEM CHAPLETS

The chaplet with everything. The "Twisted Stem" promotes rapid complete fusion. Not deformed, the stem has no weak spot to burn in and permit core shift. Made in a complete range of sizes. Samples of the size you use, gladly submitted.

"THE TWIST DOES THE TRICK"

FEDERAL'S LOWE SIFTER

Save money by faster sifting, better sand conditioning with a Lowe Electric Sifter. Features: greater screening area, enclosed ball bearing motor, more shoveling room. Write for information. Prompt delivery.

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

CROWN HILL, W. VA. · CHICAGO · MILWAUKEE · RICHMOND, VA. · ST. LOUIS

CHATTANOOGA, TENN. · MINNEAPOLIS · NEW YORK · DETROIT · UPTON, WYO.

(*Continued from page* 172)

brass and bronze; and bearing metals. Meetings were held at the mechanics laboratory of the new Vancouver Vocational Institute, which is well equipped to give practical instruction in all physical testing and heat treating procedures, and the lectures were given by Prof. W. M. Armstrong, Department of Metallurgy, University of British Columbia. It is hoped that sufficient interest has been aroused to continue with a similar course next year.—*W. R. Holeton, British Columbia Research Council.*

Connecticut Non-Ferrous

MOTION pictures on "Foundry Chaplets and Chills" were featured at the Oct. 19 meeting of the Connecticut Nonferrous Foundrymen's Association, at Castle Restaurant, New Haven, Conn.

The two motion pictures, produced by the Fanner Mfg. Co., Cleveland, showed the manufacture of chills and chaplets and depicted their many uses. In the discussion period, the following points were brought out: Large external chills are used to initiate a directional solidification in spots which cannot be readily fed by risers; all chills must be dry and coated in order to prevent boiling; if chaplets are necessary, an extra amount of metal should be built up on the casting at the point of support to insure enough to weld the chaplet; chaplets are not too satisfactory for nonferrous pressure castings.

It was reported that experiments are being conducted on additions of 40 mesh siilcon carbide grain to the molding sand for aluminum and magnesium castings to effect chilling. No conclusive data have been revealed but results look promising.—*Charles A. H. Knapp, R. Lavin & Sons Inc.*

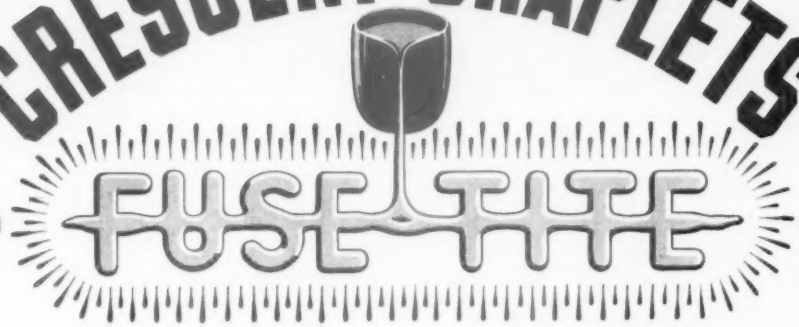
Central Indiana

CORE and molding sand practice was considered by 120 members and guests of Central Indiana Chapter of the AFS at its meeting held Dec. 5, at the Athenaeum, Indianapolis.

Eugene Conreaux, foundry engineer, Illinois Cereal Mills, Paris, Ill., the speaker, suggested that all sand should be controlled by a muller and that all materials should be added to sand on the basis of weight rather than by volume measurement. In his opinion, expansion is the most important item to watch in core making. Mr. Conreaux warned foundrymen that another important point, and one that is frequently overlooked, is temperature control of

(*Continued on page* 178)

CRESCENT CHAPLETS



If you don't see it here .... ask for it!

We manufacture a complete line of all types and sizes of Foundry Chaplets, and all kinds of wire and metal formations for your foundry use. If we don't already make what YOU need, we'll design and develop just the CHAPLET to suit your requirements. Your inquiries and specifications are invited - - - - for quick service, write for working samples. As a few of our specialties:

- RADIATOR CHAPLETS
- SHOULDER CHAPLETS
- BOILER CHAPLETS
- DOUBLE HEAD CHAPLETS
- MOTOR CHAPLETS
  (Regular or Extended stems)
- TIN TUBES
  (Plain or Perforated)
- FOUNDRY NAILS
  (Plain, Nicked or Barbed
- SKIM GATES
- CORE WIRES
- CORE PLATES and SHIMS
- TAPER DRIVE PLUGS

CRESCENT FUSETITE CHAPLETS ARE MADE ACCURATE OF PROPER ANALYSIS MATERIALS FOR THE FUSING-IN PROCESS.

Being the Originators and Manufacturers of Radiator, Shoulder, Double Head and Motor Chaplets, Your Foundry benefits by our Chaplet Manufacturing experience since 1889 for the leading Stove, Radiator, Boiler and Motor Foundries.

We carry thousands of different types and sizes in stock for quick delivery, and have the facilities to make up special sizes promptly.

WRITE FOR SAMPLES AND PRICE LIST.

Crescent Brass & Pin Company

5766 TRUMBULL AVE.

DETROIT 8, MICHIGAN

fast, thorough

sand MULLING

is accomplished only by

SPEEDMULLOR

action . . .

THE SPEEDMULLOR MULLS NOT MERELY MIXES

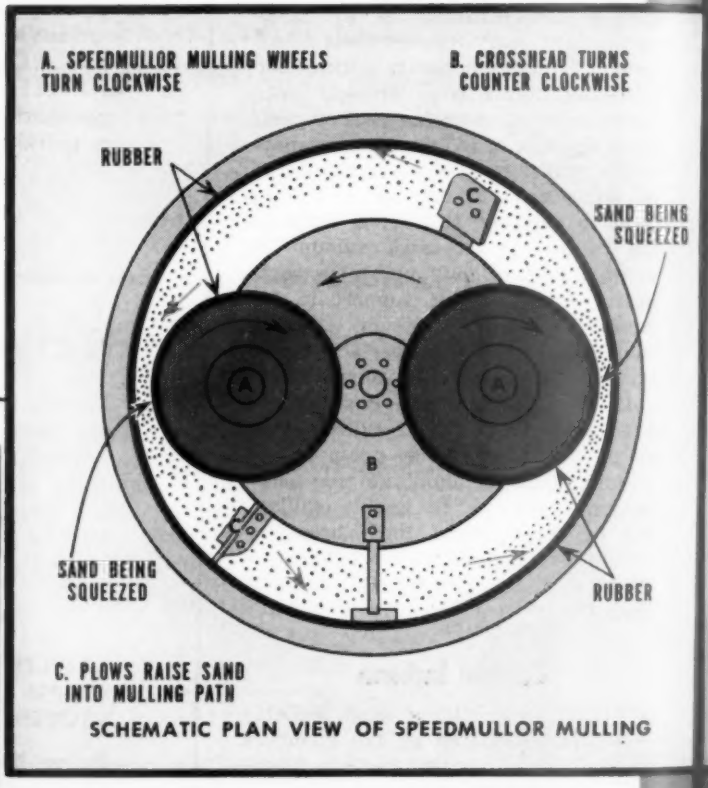
The positive turning of the rubber-tired mulling wheels, the application of uniform pressure on the sand between the wheels and rubber-lined side wall (as shown in diagram), and the rapid agitation which keeps the entire batch of sand constantly in motion, *assure* the most complete and thorough distribution of all water and bonding materials.

SPEEDMULLOR SPEED

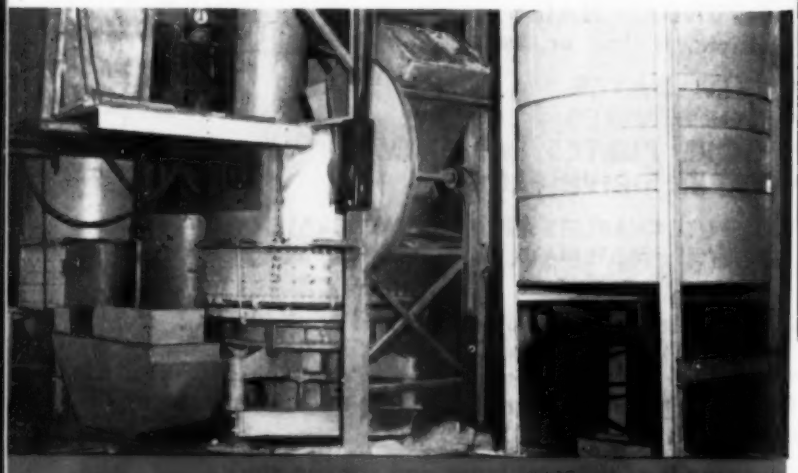
The Speedmullor is 4½ times as fast as any sand mixing unit. It thoroughly and uniformly mulls all types of sand, even sand containing the highest bond or oil additions in 1 to 1½ minute cycles.

SPEEDMULLOR ECONOMY

Better quality sand and faster mulling results in savings in mold production and in castings. The Speedmullor thoroughly mulls sand at the *lowest* cost per pound of sand mulled, including maintenance.



SCHEMATIC PLAN VIEW OF SPEEDMULLOR MULLING



Dodge Steel, Philadelphia, chose a Model "70" Speedmullor to replace a conventional mixer. This skiphoist-equipped Model "70" loads, completely mulls, thoroughly cools and discharges a 15 cubic foot batch every 98 seconds.

THESE FOUNDRIES . . . AND HUNDREDS OF OTHERS

Ferro Machine & Foundry, Inc., Cleveland, supplies automotive plants with up to 500 tons of castings per day. This Model "60" is one of five speedmullors at Ferro, supplying 380 tons of facing and core sand daily.

B&P

Beardsley & Piper are manufacturers of the Sandslinger • Speedslinger • Hydra-Slinger • Speedmullor • Mulbaro • Screenarator • Nite-Gang • Junior Nite-Gang • Preparator • B&P Champion Speed-Draw • B&P Plate Feeder • B&P Turntable • B&P Gyratory Screens

THE SPEEDMULLOR COOLS SAND PROPERLY

The *exclusive* design of the Speedmullor provides *the only method* for the passage of air *through* the entire batch of sand as it is mulled. *Only in a Speedmullor* can hot sand be cooled to within 10° of room temperature without loss of sand output. The diagram below shows how cool air is forced up from the bottom of the bowl—into the mulling area—*through* the sand—rapidly dissipating the heat and removing it from the mullor.

THE SPEEDMULLOR COOLS SAND QUICKLY

Speedmullor sand cooling is faster and more positive than any other method. *It cools as it mulls* in the 1 to 1½ minute cycle. It also aerates the sand as it mulls. Speedmullor mulled sand requires no further aeration and is absolutely uniform in quality and texture. The speed and thoroughness of Speedmullor cooling *cannot* be equalled.

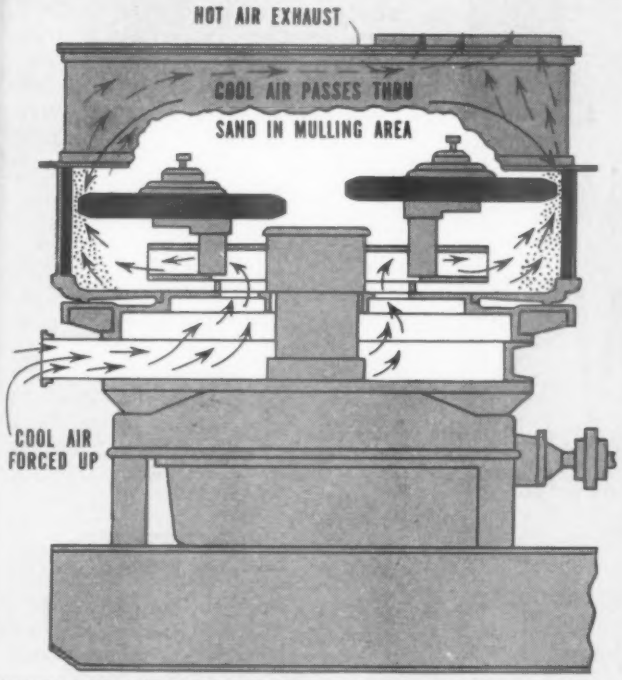
fast, positive sand

COOLING *is*

accomplished only by

SPEEDMULLOR

action . . .



SCHEMATIC SECTIONAL VIEW OF SPEEDMULLOR COOLING

American Laundry Machinery Company, Rochester, producer of the world's most complete line of laundry equipment, uses their Model "60" Speedmullor to completely mull and simultaneously cool 150 tons of sand per day.

CHOSE SPEEDMULLORS FOR MULLING AND COOLING

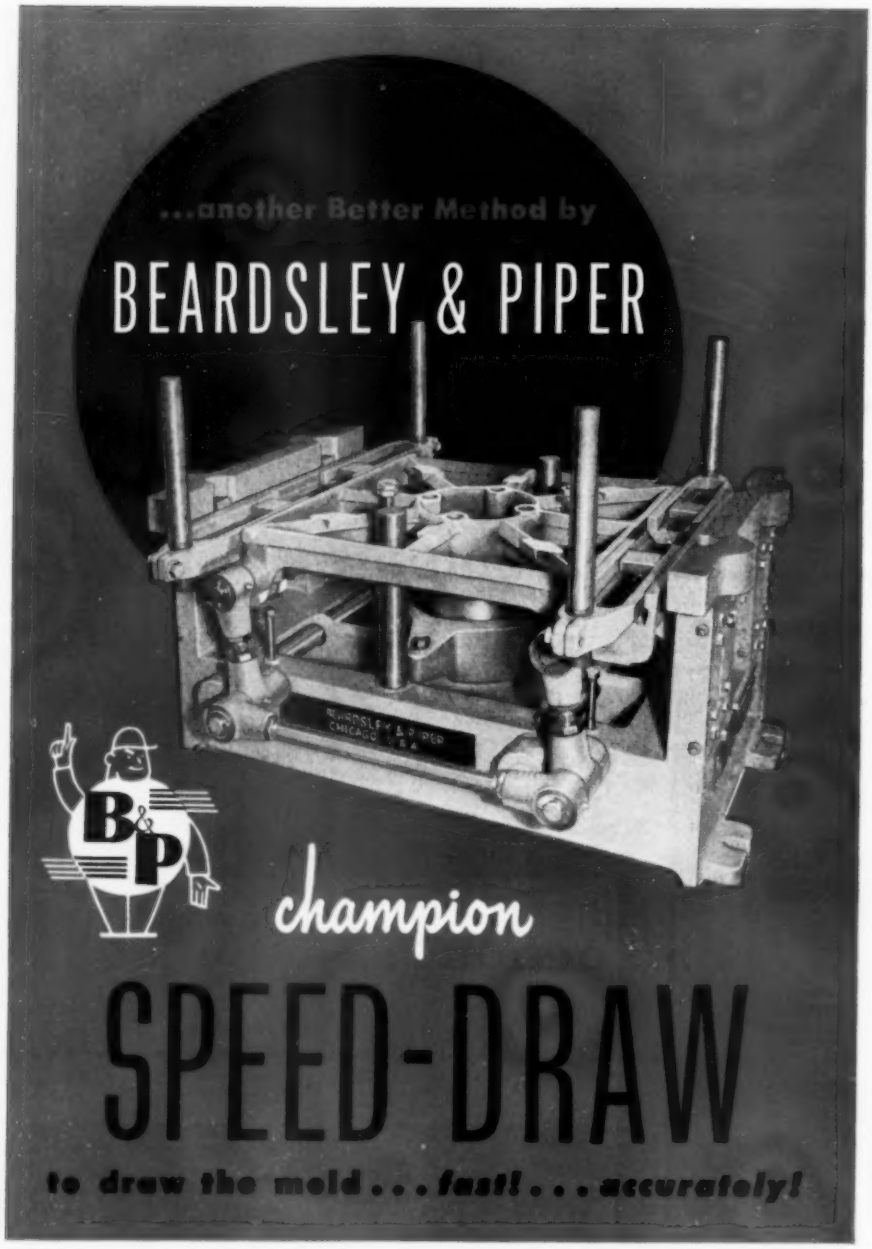
Link Belt Foundry, Philadelphia, chose Speedmullors to mull and cool all of their molding sand. Two automatically controlled Model "70" Speedmullors, with overhead batch hoppers for loading, mull and cool 700 tons of sand a day.

BEARDSLEY & PIPER

Division of

PETTIBONE MULLIKEN CORPORATION

2424 NORTH CICERO AVENUE • CHICAGO 39, ILLINOIS



The air operated, Champion Speed-Draw lifts either cope or drag mold quickly, smoothly, and economically. Pattern mounting is simplified and pattern changes are made with a minimum of interruption to production.

There are eleven Champion Speed-Draw Models—both stationary and portable — to cover a maximum range of flask sizes. Adjustable lifting pin brackets permit the use of a wide range of flask sizes on each model. Get complete information on the Speed-Draw now!

SEND COUPON FOR BULLETIN!

Beardsley & Piper are manufacturers of the Speedslinger • Speedslinger • Hydra-Slinger • Speed-sander • Mullers • Screenerator • Nite-Gang • Junior Nite-Gang • Preparator • Champion Speed-Draw • Plate Feeders • Turntables • Gyratory Screens

BEARDSLEY & PIPER
Division of Pettibone Mulliken Corp.
General Offices: 2424 North Cicero Ave. Plant: 2541 North Keeler Ave.
Chicago 39, Illinois

☐ Send B&P Champion Speed-Draw Bulletin ☐ Have B&P representative call

FOUNDRY
ATTENTION
TITLE
ADDRESS
CITY ZONE STATE

(*Continued from page* 175)

sand.

Two series of slides, one demonstrating various bake-out times and their effects on castings, the other illustrating various casting defects caused by improperly baked cores, were shown. Linn Burk, assistant foundry metallurgist, International Harvester Co., Indianapolis, introduced the speaker.—*W. K. Mitchell.*

Ohio State University

CONTROL of sand grain distribution was the topic discussed by Clyde A. Sanders, vice president, American Colloid Co. Chicago, at the Nov. 1 meeting of Ohio State University Student Chapter of the AFS. Mr. Sanders explained that a foundry can save money and produce castings of better quality if it will determine the proper grain distribution for its type of work and will set up a system of control to maintain that distribution.

Mr. Sanders also pointed out several courses of action which engineering students might follow to make themselves of maximum use to the foundry industry upon graduation. His remarks were especially pertinent to the members since many plan to enter the foundry industry.

On Oct. 22 the chapter held a picnic at Scioto River Park, Columbus, O. Nearly 30 were present including members, wives, girl friends and the chapter's advisers, Professors Douglas C. Williams and R. P. Schneider. Arrangements for the picnic were made by John Anibal assisted by Edward Losely, Harold Gonya, Croft Merritt and David Baker.—*Dallas M. Marsh.*

Eastern Canada

SHOWING of the film, "Fluid Flow in Transparent Molds," by S. C. Massari, AFS technical director, was arranged by Eastern Canada Chapter of the AFS for its Nov. 11 meeting held at the Mount Royal Hotel, Montreal, Que. The film was prepared at Battelle Memorial Institute which is undertaking the research project and is being assisted by the Aluminum and Magnesium Research Committee of the society. Henry Louette, Warden King Ltd., Montreal, acted as technical chairman.—*A. J. Moore, Montreal Bronze Ltd.*

Quad City

FOUNDRIES are operating giveaway programs every day they run. This was the theme of the talk by Walter F. Bohm in speaking on cupola operation before the Quad-City Chapter of the AFS at its Nov.

21 meeting. Mr. Bohm is foundry metallurgist with the Buick Motor Division of General Motors Corp., Flint, Mich.

According to the speaker, many foundries waste coke in operating with too large a coke split. An ideal ratio is 10 to 1, which has been achieved at Buick, but which is probably better than the industry in general. In order to benefit through a favorable coke ratio, Mr. Bohm stated it is necessary to exercise stringent control of cupola practices. He recommends uniform coke, not the very large and the very small mixed. The speaker also stated the most important characteristic of coke is its structure, yet there is no means for testing it. If the structure is weak, the loss in handling will be great and its usefulness in the cupola reduced.

Another factor in good cupola operation is the necessity for good scrap specifications and proper charging. Mr. Bohm advised the charge should be leveled with sufficient coke to cover it entirely. The charge also should be permeable in order to have a soft blast.—*R. E. Miller, John Deere Planter Works*

Saginaw Valley

THE Nov. 3 meeting of Saginaw Valley Chapter of the AFS, at the Fischer Hotel, Frankenmuth, Mich., was designated Suppliers' Night. There were 225 members and guests in attendance and of this number 50 were suppliers.

The speaker of the evening was Edward McFaul whose talk was entitled "So You Think You're Slipping." Mr. McFaul is associated with the Mid-West Institute, Chicago, and is well known in the field of human and public relations.—*Kenneth H. Priestley, Vassar Electroloy Products Inc.*

Central Illinois

GUEST speaker at the Nov. 7 meeting of Central Illinois Chapter of the AFS, held at the Jefferson Hotel, Peoria, Ill., was Lester B. Knight, Lester B. Knight & Associates Inc., Chicago.

Mechanization, Mr. Knight declared, is a challenge to, not a substitute for management. All interferences with production are within the control of supervision, and the importance of anticipatory thinking by management and supervision was discussed. Mechanization cannot be effective when limited to production lines. It should be extended, according to the speaker, to include cost systems, the measured work day, or

New the NITE-GANG

for complete sand conditioning

only the NITE-GANG offers these

10 IMPORTANT FEATURES

- Self Propels!
- Self Loads—Without Prior Windrowing!
- Blends!
- Magnetically Separates!
- Breaks Lumps and Screens!
- Doubles Aerates!
- Windrows or Piles!
- Travels and Loads at Variable Speeds!
- Leaves a Clean Level Floor!
- Extremely Maneuverable!

As the Nite-Gang moves into the unprepared sand heap the rotating spiral completely blends and conveys all of the sand in its path to the bucket elevator. The buckets elevate and direct the sand onto the magnetic separator which removes all of the iron scrap and shot before the sand is discharged into the M5 Screenarator Unit. The Screenarator, mounted on a swivel base, screens, double aerates and windrows or piles the completely conditioned sand anywhere within an arc of 240 degrees and within a radius of forty feet.

Write for new Nite-Gang Catalog!

BEARDSLEY & PIPER
DIVISION OF PETTIBONE MULLIKEN CORPORATION
2424 North Cicero Avenue • Chicago 39, Illinois

Beardsley & Piper are manufacturers of the Sandslinger • Speedslinger • Hydra-Slinger • Speedmuller • Mulbaro • Screenarator • Nite-Gang • Junior Nite-Gang • Preparator • Champion Speed-Draw • Plate Feeders • Turntables • Gyratory Screens

wage incentives, and good housekeeping. The days of the man who wears his hat three ways are gone. One man cannot effectively be the foundry engineer, the foundry metallurgist and the factory manager.

W. J. MacNeill, Dayton Malleable Iron Co., Dayton, O., who is active in the Foundry Educational Foundation, gave the coffee talk. Outlining the value of a vigorous foundry educational program, Mr. MacNeill said it is vital to the foundry industry to progress in step with advances being made by competitive fabrication methods.—*John R. Nieman, Caterpillar Tractor Co.*

Philadelphia

APPROXIMATELY 150 members and friends attended the Nov. 11 meeting of Philadelphia Chapter of the AFS at the Engineers Club and heard Zigmond Madacey, foundry superintendent, Caterpillar Tractor Co., Peoria, Ill., discuss "Does Core Blowing Belong in Your Shop?" The speaker was introduced by Hans Jacob, superintendent, Lehigh Foundries, Easton, Pa.

Mr. Madacey discussed factors for successful core blowing, including sand control, know-how, and co-operation of every department involved. He stressed the fact that a foundry need not be a production shop to realize savings and speed of production by use of core blowing equipment.

A sand shop course was completed successfully Nov. 11 at the University of Pennsylvania, Philadelphia, by 61 foundrymen and technical operating people. The course was directed by Frank Brewster, Harry W. Dietert Co., Detroit, with the cooperation of a committee of the Philadelphia Chapter. Arnold Kraft, Wilkening Mfg. Co., was chairman of the committee and Prof. L. N. Gulick represented the university in the arrangements.—*A. J. Saute, American Engineering Co.*

They RESIST WARPAGE

. . . it's less than 0.1%

Transite Core Plates offer all these advantages:

They speed production

Core makers save trips... handle many plates at one time.

They last longer

Made of fibrous asbestos and cement, Transite Core Plates resist shock...are less likely to crack or break.

They clean easily

Core wash, sand, etc., do not stick as readily as to other materials. Both sides are usable.

They resist corrosion and warpage

Transite Core Plate surfaces stay smooth even after long service. Warpage is less than 0.1%.

They are economical

Low price, low maintenance and long life add up to low cost.

To eliminate green cores and reduce baking time perforated plates are also available.

For full details write Johns-Manville, Box 290 New York 16, N. Y.

Johns-Manville

TRANSITE CORE PLATES MADE OF ASBESTOS

Book Review

Engineering Metals and Their Alloys, by Carl H. Samans, cloth, 913 pages, 6 x 9½ in., published by the Macmillan Co. Price $7.50.

Although this is a long book, the author, who is chief, Metallurgy Section, Research Laboratory, American Optical Co., has been able to give the various metallic materials only limited treatment. Nevertheless it is pointed out that the text should meet requirements of almost any instructor teaching engineers courses in production metallurgy, physical metallurgy or engineering metallurgy. The work should meet the needs of the user of metallic materials.

Users and producers of castings will find material of interest on the production of raw materials, fabricating processes and properties of product in the chapters dealing with general characteristics of metallic engineering materials; metallurgical methods; production of metals; production of pig iron and cast iron; iron and steel making; theory of alloys; principles of heat treatment; shaping and forming of metallic materials; alloys used largely because of ease of fabrication; castings resistant to water corrosion; alloys resistant to chemical corrosion and action of heat; alloys for applications requiring high strength and toughness; alloys resistant to general wear and abrasion, and bearing alloys.

To aid in further study, numerous books dealing with the subject are listed at the end of each chapter. It is to be regretted that the author did not list the third edition of the *Cast Metals Handbook* instead of the second, and that he omitted such vol-

(*Concluded on page* 182)

GET THESE 4 BIG HELPS IN MAKING FINER CORES AND CASTINGS

For better, lower cost cores place a trial order for Krause Cereal Binders now — TRUSCOR if you like light weight; AMERIKOR if you prefer a heavier weight.

Order through any of the distributors below or write direct to CHAS. A. KRAUSE MILLING CO., Milwaukee 1, Wisconsin.
World's largest dry corn millers.

CEREAL BINDERS

DISTRIBUTORS

M. A. Bell Co.
Denver, Colo.
M. A. Bell Co.
Houston 2, Texas
M. A. Bell Co.
St. Louis 2, Mo.
A. L. Cavedo & Son, Inc.
Richmond 21, Va.
Foundry Supplies Co.,
Chicago 16, Ill.
J. H. Hatten & Son, Aldan,
Delaware Co., Pa.
J. B. Hayes Co.
Birmingham, Ala.
Independent Foundry Supply
Co., Los Angeles 11, Calif.
Marthens & Co., Moline, Ill.
Carl F. Miller & Co.
Seattle 4, Wash.
Milwaukee Chaplet & Mfg.
Co., Milwaukee 4, Wis.
Pacific Graphite Works
Oakland 8, Calif.
Porter-Warner
Chattanooga 2, Tenn.
Smith-Sharpe Co.
Minneapolis 14, Minn.
Frederic B. Stevens, Inc.
Buffalo 12, N. Y.
Frederic B. Stevens, Inc.
Cleveland 14, Ohio
Frederic B. Stevens, Inc.
Detroit 26, Mich.
Frederic B. Stevens, Inc.
New Haven 11, Conn.
Western Industrial Supply Co.
Portland 14, Ore.

Comfort that pays for itself...

Many times over

The *Improved* WILLSON FOUNDRY GOGGLES

The mask of high grade, soft, pliable leather fits any face and head size. And it distributes the shock of impact over a wide area. Fitted with WILLSON Super-Tough* lenses, of course, for maximum eye protection.

for Dusty Jobs

Style DL48

Indirectly ventilated with four baffled and screened ports in the eyecups. They permit the entrance of air— exclude dust, grit and other flying particles.

for Hot Jobs

Style DL31

Deep eyecups are well perforated to permit free air circulation to reduce fogging. Corduroy bound edges absorb perspiration. Particularly adaptable for men working under high temperature conditions in many foundry and steel mill operations.

NEW CATALOG *In addition to product information, it contains information on safety glass, filter glass, respiratory hazards, etc., which will help you select proper safety equipment to meet specific hazards. Send for it!*

WILLSON*

"Established 1870"

*T. M. Reg. U. S. Patent Office

WILLSON PRODUCTS, INC., 237 WASHINGTON STREET, READING, PA.

umes as *American Malleable Iron*, the *Steel Castings Handbook*, and *Metallurgy of Steel Castings by Briggs*.

Investment Casting

(*Concluded from page* 79)

sile requirements. Furthermore, the molds were harder to fill and required higher metal temperature. A different type of set-up designated as the "U" type (Fig. 24) gave bars which showed no shrinkage in x-ray and met tensile requirements. Best results were obtained with 1400° F mold temperature and 2850° F metal temperature as indicated on the optical pyrometer, with melting done in a small arc furnace. Air pressure of 20 pounds was used in all cases.

Due to the relative slowness in making tests on high melting point alloys, and the great secrecy regarding progress in this field, it is difficult to obtain a great deal of information on this subject. It would be very helpful to the industry as a whole if it would give some pertinent data so that many of the existing misconceptions concerning the process could be eliminated. It is, and always has been, the author's belief that real progress comes only through free exchange of information. Not only does this help the entire industry, but even gives a lift to the progressive companies who are normally afraid that such a procedure will permit others to encroach upon their business.

References

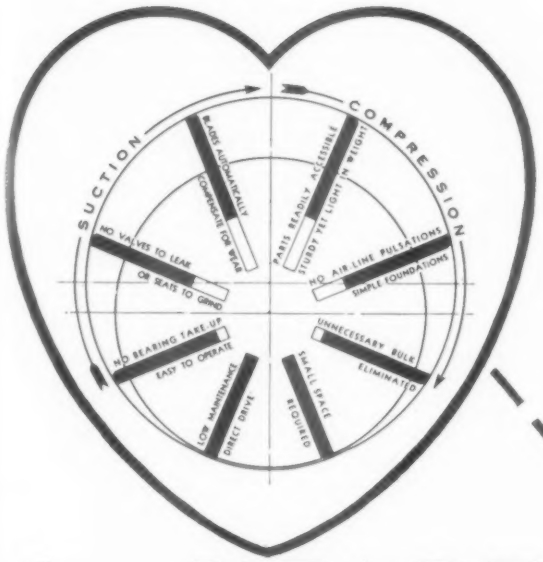
7. Brown, Hiram, "New Aluminum Alloys and Processes," *Aluminum & Magnesium*, October, 1944, pp. 24-27, 39.
8. Markus, H.; Lipson, S.; and Rosenthal, H., "Precision Cast Copper Base Alloys," *Iron Age*, November 8, 1945, pp. 64-73.
9. Neiman, Robert, "Precision Casting By Investment Molding Process," *AFS Transactions*, Vol. 52, 1944, pp. 349-383.

Book Review

Patent Law, by Chester H. Biesterfeld, second edition, cloth, 265 pages, 6 x 9¼ in., published by John Wiley & Sons, New York. Price $4.

Considerable revision has been undertaken in the second edition of this work. Recent decisions have been added to illustrate various phases of the subject of invention according to modern ideas of the courts.

The book affords the general reader a simple and understandable treatment of each of the principal subjects of the substantive law, supported by citations and quotations taken from court decisions.

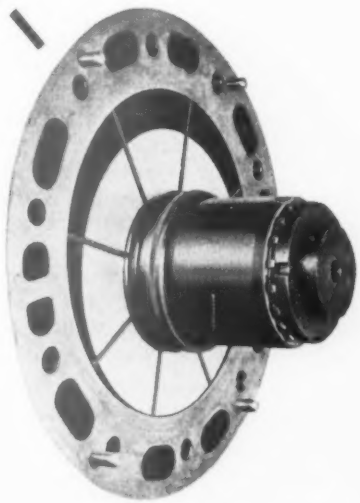


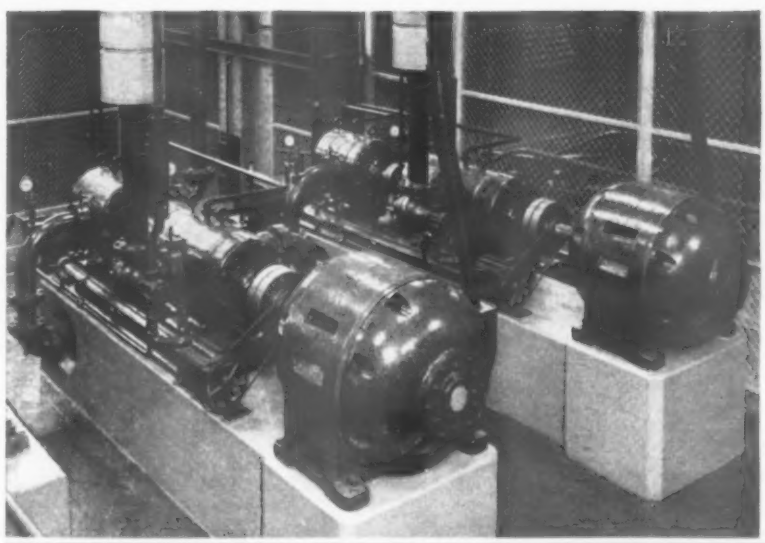
the HEART of the *Fuller Rotary Compressor*

There are innumerable reasons why Fuller Rotary Compressors are being installed in many fields of industry. The one outstanding factor is, "The Heart of the Rotary", the inherent advantage peculiar to continuous motion, with the consequent absence of pulsations and vibration; minimum number of working parts. This unequalled mechanical simplicity provides for sustained efficiency, and relief from maintenance annoyance and labor costs.

Their extraordinary capacity, with relation to size, makes them readily adaptable for use where space is limited; also installation of separate compressors at the point of air consumption. In other words: "Spot your compressors where you need the air". Such installations offer many advantages and savings when compared with a large central compressor plant, with its attendant network of plant air lines and consequent losses.

Fuller Rotaries are built for capacities to 3300 c.f.m., 125-lb. pressure. Write for Bulletin C-5, which fully illustrates and describes these machines.





FULLER COMPANY
CATASAUQUA — PENNSYLVANIA

Chicago 3 - 120 So. LaSalle St.
San Francisco 4 - 420 Chancery Bldg.

A LIFETIME OF NEW MACHINE EFFICIENCY

C-183

By PAT DWYER

Drawings by RICHEY

ADVENTURES OF Bill

ONE day last week," I said to Bill, "I had a rather unusual inquiry from a young lad of 16 faced with the problem of earning his own living. I get inquiries now and again from foundrymen who seek an expression of opinion on some item of foundry practice that is causing trouble, gnashing of teeth, tearing the hair, jumping on the hat and all that kind of thing. If I know the answer, either through actual experience, reading or hearsay, I have pleasure indeed in passing the good word along. The letter from the young man was different. For some reason—which he did not give—he wanted to know if I thought he had made a wise choice in his decision to learn the foundry business."

"I suppose," Bill said, "you gave him the old reliable yes and no answer. If he has the necessary qualifications, health, strength, courage, an open mind, tact to get along with people, ability to reason from cause to effect and vice versa, desire to take the initiative in emergencies, ambition, and a proper appraisal of himself, the foundry field offers unlimited opportunities. On the other hand, if he does not want to work or study, if he wants some other person to lay out the day's work, assume all responsibility, and constantly prod him along, he should bypass the foundry, and maybe take up crocheting or flagpole sitting."

"Unfortunately, I did not have all the data from which I might draw conclusions. Your comment reminds me that in the foundry, as in any of the other learned professions, it is rather difficult to find two experts, or two specialists of any kind, in perfect agreement in the solution of a definite problem. I deliberately include founding of metals among the learned professions. In fact, if it came up to an actual IQ showdown, I am inclined to the opinion that a properly qualified and experienced foundryman would show a greater and more intimate, detailed and comprehensive knowledge of his profession, than could be shown by some members of the so-called learned professions, law, medicine, finance, theology and others in their respective fields."

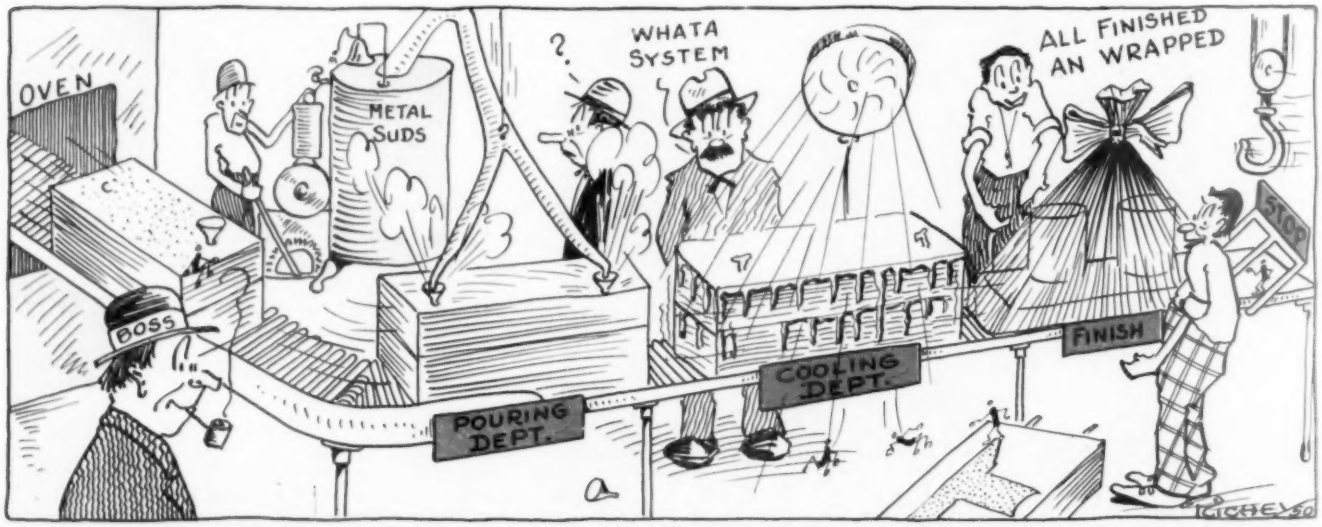
"Well," Bill admitted, "I am willing to go along with you most of the way, but I don't think you go quite far enough. A foundryman arrives at the top through hard work and hard study. Instances are not unknown of some men in other -er -shall we say less worthy professions arriving at the same goal, the high seats at the head of the table, by their wise selection of parents, or parents-in-law, or by diligently practicing the simple formula of saying *yes,* while associating only with the right people at the right time."

"Pray don't forget that a special gift, a peculiar type of mentality, is absolutely essential. The gift is bestowed by a benevolent fairy at birth, but may, and usually is, cultivated to a high state of perfection. The expert, the man who really enjoys exercising the gift, floats through life with minimum effort. The man who has not the gift, who is constitutionally, mentally and physically allergic to the *yes* germ, may or may not reach the top, but he has to fight every inch of the way.

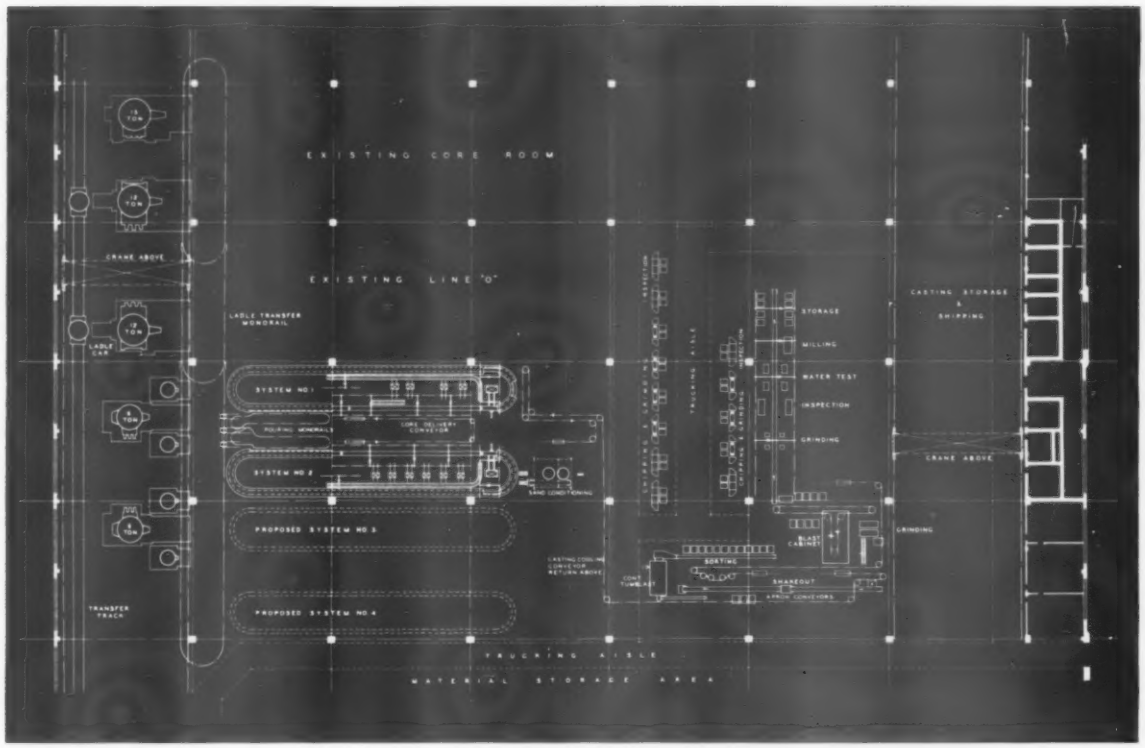
"On the other hand, and strange as it may seem, he would not have it otherwise. He touches the peak of human happiness only when engaged in mortal combat. The old-time boys in chain mail armor had what it takes in the days when knighthood was in flower. Crusaders, ancient and modern, had and have it. Men who fought floods, fires, droughts, famine, disease and death while pushing the American frontier to the West, had the divine spark. They never surrendered."

"That last sentence has a familiar ring. You must have been listening to the radio a few years ago. To get the proper effect you should pronounce it in the original form 'We shall NEV-AH SA-REN-DAH!' Instead of chasing or whipping the monkey or you-know-who around the stump, the mulberry bush, or the old red barn with a flock of generalities, why don't you tell this young seeker of the light, the life story of Jas.

(*Continued on page* 186)



Popular conception of mechanical foundry operated with military precision and with minimum number of men



FIAT, Turin, Italy—Mirafiore Plant

FIAT, one of the leading automobile manufacturers, has retained Giffels & Vallet, Inc. to modernize their foundry facilities to American standards of production using American equipment.

The many features contributing to the layout and design of this foundry were accomplished through the combined efforts of the foundry engineers of Giffels & Vallet, Inc. and the Owner's representatives, whose intention it is to make this the most modern foundry in Europe.

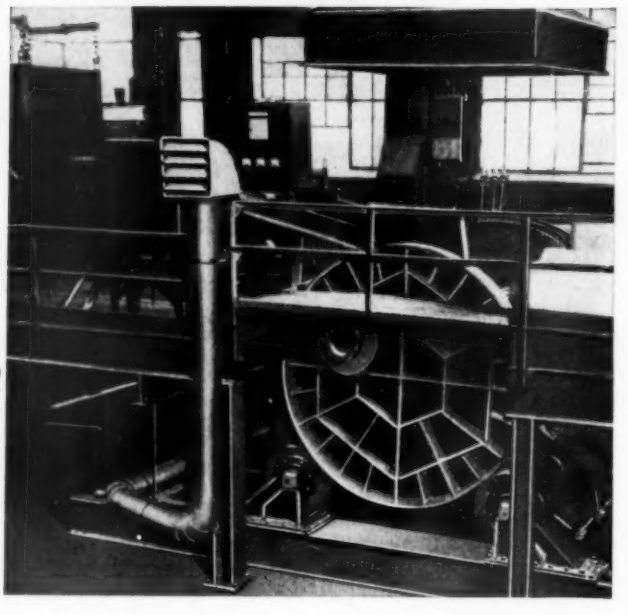
Our foundry engineers are available to assist you. We will gladly, without obligation, discuss your engineering problems and the assistance we could render.

GIFFELS & VALLET, INC.

INDUSTRIAL ENGINEERING DIVISION

1000 MARQUETTE BUILDING, DETROIT

Scovill installs WORLD'S LARGEST AJAX - SCOMET Electric Induction Furnace



One of the three 1000 KW. Ajax-Scomet Electric Induction Furnaces, for melting brass, recently installed at Waterbury, Connecticut for the Scovill Manufacturing Company.

For faster melting, lower melting losses, close temperature control, and complete dependability in quality results, Scovill Manufacturing Company chose the 1000 KW. Ajax-Scomet Electric Induction Furnace for its new plant. It is the largest and most powerful electric melting furnace ever made for brass.

Holding capacity is 20,000 pounds, with an hourly melting rate of 5½ to 6 tons. Under controlled conditions, molten metal is supplied to continuous casting machines for the production of brass strip of unprecedented size.

Ajax engineers bring you over thirty years' experience in the induction melting field. Ajax-Scomet Electric Induction Furnaces offer distinct advantages in cost reduction and manufacturing efficiency.

AJAX TAMA-WYATT

AJAX ENGINEERING CORPORATION, Trenton 7, New Jersey

INDUCTION MELTING FURNACE

Associate Companies: AJAX METAL COMPANY, Non Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

(*Continued from page* 184)

A. Murphy, master foundryman, gentleman farmer, inventor, consultant, manufacturer, and pioneer in many phases of foundry practice, now accepted and regarded as routine."

"Faith" I said, "and likewise begor, I don't know of anything that would give me greater pleasure. Forty years ago Jim was using a fire hose to break down and remove dry sand cores from large castings. Somewhere in his wide and omniverous reading he found a reference to hydraulic mining where a stream of water from a powerful pump breaks down and disintegrates large bodies of earth, rock, and sand, and reduces the material to a condition where it may be processed for extraction of any precious metal content.

The man is extremely annoyed

"At the age of sixteen, young Jim, filled with energy, ambition and a consuming curiosity, saw no prospect of achieving fame and fortune in his native Ireland. He packed his scanty belongings, including a favorite blackthorn, and sailed away to Boston, a fairly well known city on the Atlantic side of the state of Massachusetts. Here his education and familiarity with the city and surrounding territory progressed so rapidly that inside a year he could pronounce and spell the Indian name of the state as readily as if he had been born in the shadow of the gilt-domed state house. Proof that millions of people in this *E Pluribus Unum* nation, even down to this very day, cannot spell the word is indicated by the fact that it has been shortened down to Mass., another example of Yankee ingenuity.

"While looking around for a job, Jim interviewed the portly proprietor of a foundry. Greatly impressed by the gold watch and seals, the elegant

clothes and the horse and phaeton standing outside the door, Jim decided the foundry was the place for him. In exchange for a truly modest sum per week, he agreed to work faithfully and to the best of his ability for a period of four years. In return the philanthropic party of the second part promised an opportunity to learn all there was to know about the art and mystery of founding in metals.

"The wage met Jim's modest requirements. In those far away and halycon days room rent was $2 per week. At a favorite restaurant one could get a weekly ticket for $1. The room did not have a grand piano, a chaise longue, velvet drapes at the windows, or genuine works of the old masters on the walls, but it had a pitcher and bowl, and a bed in which a tired man or boy could sleep as soundly as Rip Van Winkle. The menu in the restaurant was not as wide and varied as that in the Parker House or the Touraine, but it was ample in taste and quality, and —in the expressive language of the period—it stuck to the ribs. By the time Jim was twenty he was as husky and strong as a young grizzly bear and as handy with the dukes as any of his militant ancestors. Keeping up with the procession he sported a noble mustache, waxed to needle points at the ends.

"Always a voracious reader and a seeker after knowledge, Jim haunted the public library, and also attended classes where he studied mechanical drawing and allied engineering subjects. In addition to the practical knowledge, he acquired culture and polish, and a sharpening of his native Irish wit—accomplishments which stood him in good stead in later years when he filled important administrative positions with poise and dignity. His studies, technical and practical knowledge, facility with tongue and pen, and engaging personality were factors in his election to the position of secretary to the Associated Foundry Foremen, an organization developed by Henry Hansen, at that time editor of THE FOUNDRY, and Archie Louden, superintendent, Abendroth Bros., Port Chester, N. Y. After several years independent existence, but in close affiliation with the American Foundrymen's Association, the organization was dissolved, and the members were absorbed by the latter association.

"Experience gained in several shops after the apprenticeship period convinced Jim that if he had the opportunity he could do as well and maybe a little better than some of the gaffers at that time administering the high justice, the middle and the low. He also objected violently to a vicious custom prevalent in a few shops where the foremen levied tribute on their men. The molders had to keep the imperial potentate supplied with liquor and other valuable considerations, or ELSE! Jim did not carry on a campaign by himself or do it all single handed, but he occupied a prominent seat in the band wagon which eventually cleaned up the situation.

"Long before the Sea-Bees, champion fixers of anything and everything afloat and ashore, long before these miracle workers coined or adopted the slogan 'The hard jobs we do first. The impossible jobs take a little longer,' Jim was thinking along the same line. Acquiring a job as a foreman was not quite as easy and simple as getting a job on the floor or bench, or as spearheading a drive to break up a long intrenched and disgraceful custom. Finally he secured a position as foundry foreman, the beginning of a long and interesting career in a field where he always has been a shining light.

AJAX

HIGH TENSILE

MANGANESE BRONZE

high in strength, toughness and corrosion resistance.....

long time favorite with mfrs. of marine fittings.....

leaves sand clean and bright—takes a mirror-like finish.....

recognized as the highest quality manganese bronze available.....

AJAX METAL CO.

PHILADELPHIA 23, PA.

ASSOCIATE COMPANIES

AJAX ELECTRIC · AJAX ELECTROTHERMIC CORP · AJAX ELECTRIC FURNACE

AJAX ENGINEERING CO.

"Constantly seeking wider fields and greater opportunity to produce better castings and a greater number of castings at reduced cost in any given time, he moved to the Middle West and in succession held a superintendent's position in Erie and Franklin, Pa., and in Cleveland. In 1907 he was appointed foundry superintendent in a prominent Hamilton, O., plant engaged in the production of engines and miscellaneous heavy machinery. Over a period of 13 years, 1907-1920, he introduced many startling innovations in melting, molding, coremaking and cleaning practice.

"For some time after his firm had built and installed the battery of large gas engines in the Ford Highland Park power house, Jim enjoyed the confidence and friendship of Henry Ford. The motor magnate was legitimately proud of many things, but he was particularly proud of the gleaming, immaculate power house where the great engines and giant, polished flywheels move as sweetly, silently as the mills of the gods referred to so admiringly by the late Mr. Longfellow.

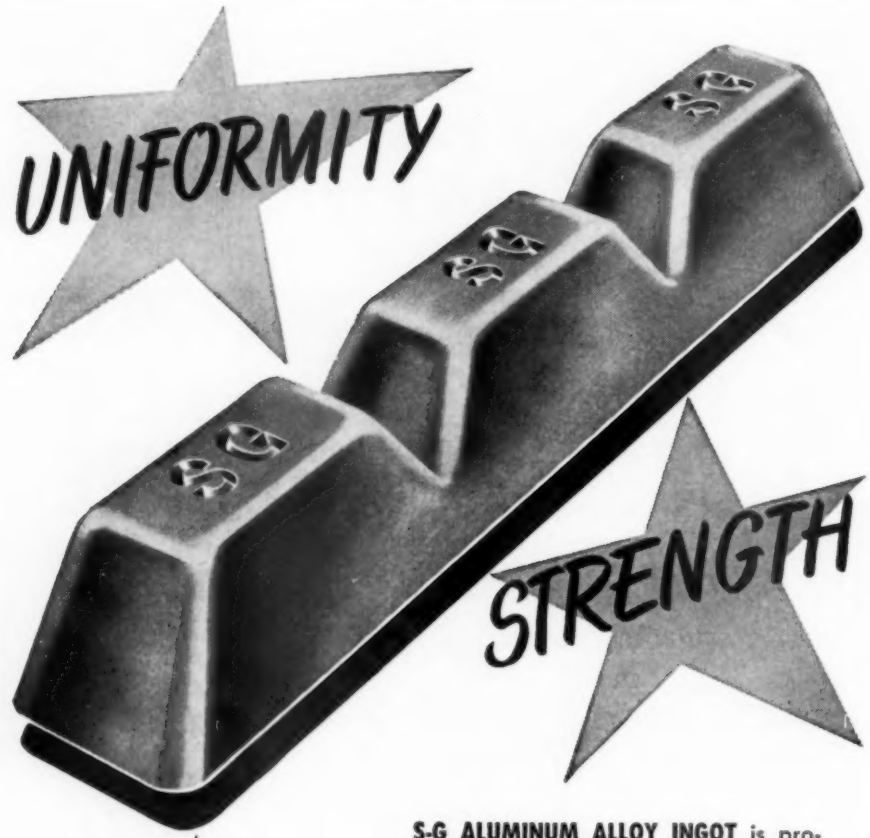
"Ford's love for the engines was inspired by true craftman pride. Through training, instinct and environment he was in position to appreciate a perfect piece of work. His interest and admiration led to many week-end meetings where Ford consulted Jim on many minor and major problems. The inevitable break, the severance of diplomatic relations which always comes when two positive type men hold opposing views, came when Henry asked Jim's opinion on the proposal to pour automobile castings from metal direct from the blast furnace. Jim told him flatly it could not be done.

"A prominent citizen of his adopted city, Jim has taken an active part in many civic enterprises, education, sanitation, general welfare, community chest drives, and patriotic demonstrations. Following his resignation from the engine building plant he engaged in managing, in person or by deputy, an extensive sand deposit, a farm and other real estate holdings.

"For a period of three years he served as manager of the foundry department of a prominent Mexican iron and steel plant. His original contract was for a three-month period as a consultant. During his connection he installed additional departments for the manufacture of manganese steel castings, chilled cast iron car wheels, and cast iron pipe. Since his return to Hamilton several years ago, he has built a plant and developed a steadily expanding business in the manufacture of aftercoolers and separators for compressed air lines. Side lines include a device for making wax vents, and a pistol type sprayer for applying blacking to a mold face.

"Probably his most spectacular feat, a feat that won eulogistic reference in THE FOUNDRY April 15, 1919, was the amazing record production of a complete set of castings for a 2800-hp triple expansion marine engine, every day for a year. Following excerpts from the article will form an appropriate conclusion to this brief biography:

If medals were awarded for industrial daring there is at least one builder of marine engines who has earned numerous citations. . . The foundry superintendent examined the plans and on his assurance that the large castings needed could be produced on schedule, the company offered to build a complete engine per week. . . Later he begged to offer an amendment. He would make castings for two complete units per week. . . .The foundry not only met the need for two engines per week, but bettered the schedule and turned out the heavy castings for a complete engine per day. . . . The high, intermediate and low pressure cylin-



S-G ALUMINUM ALLOY INGOT is produced by craftsmen whose skill and know-how assures you of uniform raw material with which to work. For all types of castings — Die — Permanent Mold or Sand Cast — aluminum alloys trademarked **S-G** are recognized for their uniform quality and the way they meet the most rigid specifications both as to chemical and physical analysis. Our complete modern research and testing laboratory facilities are available to aid you at any time.

SONKEN-GALAMBA *Corporation*
MEMBER ALUMINUM RESEARCH INSTITUTE
Riverview at 2nd Street · Kansas City 18, Kansas

der castings weigh 21,200, 21,300 and 22,900 lb, respectively.

"Do you think," I said, "that story will encourage the young man to go ahead and become a foundryman?"

"Well," Bill said, "I'll tell you. If this lad, no doubt a fine upstanding young fella, has the proper mixture in his makeup, that story should touch off the fuse."

Pick Second British Foundry Team

Sponsored by the National Ironfounding Employers' Federation, the Ironfounders' National Confederation and the Engineering and Allied Employers' National Federation, the British gray iron jobbing industry has selected a team to visit America, within the scheme evolved by the Anglo-American Council of Productivity. The team, which will comprise representatives of supervision, technology and craftsmanship, plus a secretary, will exclude malleable, automobile, builders' and domestic castings, cast iron pipe, etc. This will be the second British foundry group to study American industrial methods and equipment. The British steel founders team was here last spring.

Gray Iron Wage Rate Report Published

Data compiled from 632 industry contributors, both captive and jobbing foundries, have been developed into the "1949 Wage Rate Report for the Gray Iron Castings Industry," by the Gray Iron Founders' Society, Cleveland. Both straight time hourly rates and incentive earnings for 51 foundry job classifications are covered in the 120-page booklet.

In addition to information on prevailing labor rates in the industry, the survey includes up-to-date summaries on such issues as pension plans, life insurance for employees, profit-sharing plans, number of paid holidays, etc. The report is available for $15 from the Gray Iron Founders' Society, 210 National City-East Sixth Bldg., Cleveland 14.

Book Review

SAE Handbook 1949, cloth, 933 pages, 5½ x 8 in., published by the Society of Automotive Engineers, 29 W. 39th St., New York. Price $10.

Standards and practices recommended by the Society of Automotive Engineers, including new and revised specifications, are included in this volume. Extent to which castings are utilized in the production of motor cars and trucks is well illustrated by the number of standards and specifications on castings which are included in this handbook.

Under new specifications the volume includes data on corrosion-resistant alloy steel castings and heat-resistant alloy steel castings. The following are included under the heading of revised specifications: Automotive iron castings, malleable iron castings, pearlitic malleable iron castings, aluminum castings, copper-base castings, magnesium castings, babbitt bearing metals and zinc alloys. Revised specifications on shot and grit for cleaning also are included.

The text is divided into 10 parts as follows: 1. Aeronautical materials, parts and codes; 2. Units, parts and fittings; 3. Processed materials; 4. Fabricated materials; 5. Screws, bolts and washers; 6. Tests, ratings and codes; 7. Transportation and maintenance; 8. Tools and production equipment; 9. Nomenclature, tolerances, conversions; 10. Miscellaneous.

Plenty of Pull
for efficient
TRAMP METAL SEPARATION
Here's the World's Largest Magnetic Pulley — especially designed to protect a pulverizer at a large power station by removing all tramp iron from run of mine coal.
Tremendous magnetic attraction — that's the real story of this 60" diameter pulley installation. Note how the 3" bolt has been pulled to the face of the pulley from nearly 2½ feet!
You may not require so large a pulley or magnetic separator to protect your machinery or purify your product, but whatever your requirements, consult STEARNS MAGNETIC — largest exclusive manufacturers of magnetic separation and transmission equipment.
Electro and Permanent Magnetic Pulleys EXPERIENCE ENGINEERED to fit your requirements. Write today for descriptive literature.
Stearns MAGNETIC MANUFACTURING CO.
662 S. 28th St., Milwaukee 4, Wis.

NEW Equipment AND SUPPLIES

For Additional Information on these Items Use Reply Card—Page 193

(1)—Testing Machine:

Baldwin Locomotive Works, Chester Park & Simpson, Philadelphia 42—Universal testing machine of 60,000 lb capacity with two ranges is designed with the hydraulic loading unit separate from the indicating and control unit. Thus recoil from breaking specimens is isolated and maximum or lazy hands can be adjusted with minimum drag. Load (either in tension or compression) is applied by an integrated piston and elevating cage consisting of the table, two uprights and upper gripping head, all of which have a 6-in. stroke. The lower gripping head is the upper member of a second, adjustable cage including two long columns and lower crosshead supported by a vertical screw extending downward from the closed end of the hydraulic cylinder. A motor drive for positioning the lower gripping head within the loading cage, is standard equipment. The 60,000-lb range is graduated in 100 lb units on a 16 in. diam indicator dial and a 12,000-lb range is graduated in 20 lb units. Bourdon gages for both ranges are precision Emery type, with accuracy within 1 per cent or one dial division, whichever is greater. A standard Baldwin recorder can be used with the machine if desired.

For More Details Circle No. 1—Page 193

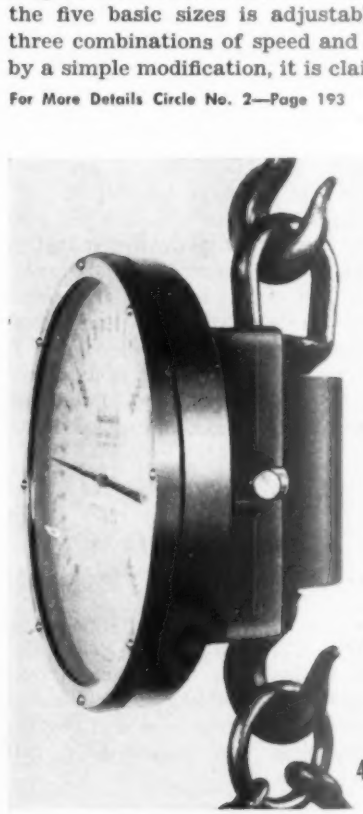
(2)—Chipping Hammers:

Rotor Tool Co., 17325 Euclid Ave., Cleveland—New line of chipping hammers is designed to provide 15 combinations of speed, stroke and blow. The line is based on five basic models, C-10, C-15, C-20, C-25 and C-30, shown here. These model numbers refer to 1, 1½, 2, 2½ and 3-in. piston strokes, respectively. Weights range from 10½ to 13⅞ lb, and lengths from 10⅜ to 13⅞ in. Each of the five basic sizes is adjustable to three combinations of speed and blow by a simple modification, it is claimed.

For More Details Circle No. 2—Page 193

2

3



4

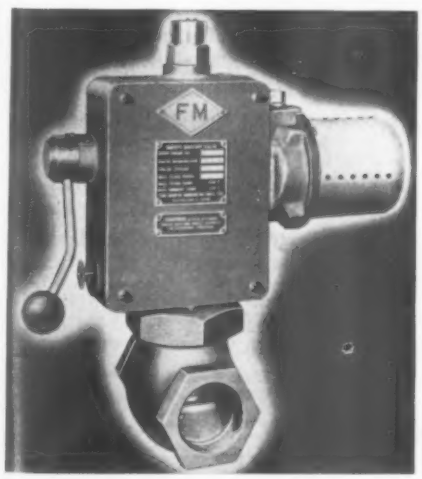
(3)—Crane: Silent Hoist & Crane Co., 885 63rd St., Brooklyn 20, N. Y.—Front boom crane of 5 tons capacity has four speeds forward (up to 14 mph) and one speed in reverse. Drive power is applied through the front wheels with rear wheel steering. The crane is said to be capable of climbing a 10 degree grade with full load on the hook. The load as well as the boom are raised and lowered by power. No part of the boom, no cables or chains pass over the driver's head. A single lever control is provided for hoisting, power reverse-gear lowering, and holding in neutral. Runaway loads are avoided through automatic braking of the load.

For More Details Circle No. 3—Page 193

(4)—Crane Scales: Hydroway Scales Inc., 20624 West Eight Mile Rd., Detroit 19—The company's line of hydraulic crane scales has been expanded by new models to provide 8, 12, 24 and 30-in. diam dials in varying capacities up to 25 tons. The new 24 and 30-in. dials offer more accurate reading, especially in the larger capacities and adapt the scales to specialized applications, it is claimed. The scales function on the static pressure principle, and while their primary application is weighing of stock and materials on the spot without transporting to weighing stations, a secondary application is protection of equipment against overloading.

For More Details Circle No. 4—Page 193

Safety Shutoff Valve: North American Mfg. Co., 4455 East 71st St., Cleveland 5—Safety shutoff valve is designed for protecting industrial furnaces against dangerous accumulations of gaseous or liquid fuels in the event of a power failure. Valve stops the flow of gas or liquid instantly when the current to its solenoid is interrupted. When power is restored, the valve remains closed until the trouble is corrected, at which time the valve is reset manually. Any number of switches wired in series with the solenoid can protect the installation against explosion hazards resulting from failure of air pressure, gas or oil pressure, etc., in addition to general power failure, or the valve may be tripped closed manually if desired. It cannot be wedged or propped open with power off since the resetting handle is independent of the valve stem. Valve can be furnished with auxiliary switches for independently powered alarm systems. Available in sizes from ¾-in. through 6 in., it may be equipped with solenoids of 110, 220, or 440 v and 60, 50, and 25 cycles.



For More Details Circle No. 5—Page 193

Steel Shelving: Equipto, Division of Aurora Equipment Co., 422 Cleveland Ave., Aurora, Ill.—Steel shelving is designed for easy assembly with a stud that slips into a hole in the shelf and into a keyhole in the upright. The shelf is pressed down and the assembly is complete. No nuts, bolts, or tools are needed for shelf or divider adjustment. Shelves are movable on 1½-in. centers, dividers on 1-in. centers. All parts are adjustable from front of unit. This type construction is available in open and closed shelving, parts bins, and counters.

For More Details Circle No. 6—Page 193

Bridge and Amplifier: Ellis Associates, Box 77, Pelham 65, N. Y.—Battery-powered, portable bridge and amplifier is said to provide the missing link between SR-4 gages and similarly actuated pickups and any cathode ray oscilloscope. The combination makes a versatile mechanical measuring device. Strains being such a fundamental mechanical reaction, this equipment gives an insight into all kinds of mechanical problems of function as well as strength. Vibration, damping, displacement, acceleration, pressure, weight, loads and stresses can be seen during actual operation. Any kind of signal from static to high speed impact is reproduced. Unit has a built-in calibration system.

For More Details Circle No. 7—Page 193

Jointer: Walker-Turner Division, Kearney & Trecker Corp., 639 South Ave., Plainfield, N. J.—Six-inch jointer is said to have the following features: Dual purpose guard permits planing stock ribbon thin or in narrow strips with safety, rabbets up to ½-in. deep, quick action fence lock—one lever for both tilt and lateral movement, rear knife guard covers knives at all times regardless of fence position, cast iron milled tops with machined dovetailed ways controlled by handwheels and lock knobs, and balanced steel cutterhead of three-knife safety type, 2½ in. in diam.

For More Details Circle No. 8—Page 193

Relaxation Machine: Baldwin Locomotive Works, Chester Park & Simpson, Philadelphia 42—Machine of 4000-lb capacity performs relaxation tests at temperatures up to 1800° F automatically, including a record of the rate of decline of load. Relaxation tests are useful beyond the direct application of data on the behavior of metals at constant total strains. They establish the relative ability of a material to withstand stress at high temperature. They also are valuable in estimating creep values in certain ranges of stress and temperature for high-strength alloys and in predicting mechanical properties of metals at high temperatures. The machine automatically relaxes tensional loads from as

(*Continued on page* 195)

For the 8th Time IT'S CLEVELAND IN 1950

54th ANNUAL FOUNDRY CONVENTION AND EXHIBITION

It is definitely not too early to mark your 1950 calendar for the following dates and plan to be in Cleveland—

MAY

8...9...10...11...12

1950

It is CLEVELAND in May foundrymen say! For the eighth time in the history of the American Foundrymen's Society, Cleveland has been chosen as the scene of the Fifty-Fourth Annual Convention and Exhibit. In the great Arena and Exhibit Halls of Cleveland's magnificent Public Auditorium foundrymen from many parts of the world will gather to view the latest in foundry equipment, supplies and accessories and to attend the many valuable sessions on up-to-date casting practice.

Again the Northeastern Ohio Chapter of The American Foundrymen's Society, thoroughly experienced and seasoned in handling the many details of a convention of this size, will swing into line with the many committees and activities necessary to assure a smooth-running program.

This is just a preliminary announcement of this important event so that readers of The FOUNDRY throughout the world may make their plans to attend the convention and reserve accommodations well in advance.

THE FOUNDRY

—Will again present two outstanding issues devoting additional editorial space to convention activities

The Pre Convention Issue for May

Will be another great issue of The FOUNDRY, previewing the convention, giving the highlights of this important week and a complete program of the show and technical sessions. This issue of The FOUNDRY will be published well in advance of the opening of the convention and all advertising messages will be seen and read before time to come to Cleveland.

The Post Convention Issue for June

Will contain in addition to all the regular features, a story of the show, what happened, who presided at the sessions and a general and interesting story on the convention itself, interpreting it in terms of benefits to all foundrymen whether they attend the show or not. This will be a great issue after a great show!

WHEREVER METALS ARE CAST YOU'LL FIND

THE FOUNDRY

a Penton Publication

PENTON BUILDING CLEVELAND 13, OHIO

HELPFUL LITERATURE

50. Chipping Hammers

Cleco Div., Reed Roller Bit Co.—12-page illustrated bulletin No. 75B discusses pneumatic chipping, caulking and beading hammers. They are available with wafer or tubular valve and with closed handle or open type equipped with bolt or ratchet locking device.

51. Sand Ramming Equipment

Beardsley & Piper Div., Pettibone Mulliken Corp.—36-page illustrated catalog No. 310 describes nine models of stationary Sandlinger and Speedslinger sand ramming machines. Application photographs, specifications and detailed drawings are included for each model; and stroboscopic photographs illustrate slinger ramming action.

52. Blast Cleaning Equipment

Pangborn Corp.—24-page illustrated bulletin No. 1200 presents data on line of equipment for blast cleaning small, medium, large, fragile and mixed size castings; continuous cleaning; shot peening; decorative carving and dust control.

53. Electric Thermometers

Illinois Testing Laboratories, Inc.—8-page illustrated bulletin No. 2451-C depicts and describes Alnor distant-reading electric thermometers. Bulletin shows how to obtain accurate temperature readings between −100° and 400° F at points up to 1000 ft distant. Services, applications, installation and operating instructions, and prices of each size and style are set forth.

54. Materials Handling Box

Production Accessories Co.—4-page illustrated folder contains descriptions of Trans-A-Box heavy-duty folding materials handling, shipping and storing box and pallet. Made of heavy gage expanded metal supported by steel framework, units are easy to stack and collapse to 25 per cent of bulk for storage.

55. Rotary Positive Blowers

Roots-Connersville Blower Corp.—8-page bulletin 21-B-37 features small size type AF rotary positive blowers for pressure or suction service. Blowers are built in 18 standard sizes with capacities ranging from 5 to 700 cfm up to 3 lb, 5 to 415 cfm up to 5 lb, and 15 to 245 cfm up to 7 lb. Driving arrangements are illustrated, and charts show operating characteristics under constant, variable and multi-speed operation.

56. Protective Equipment

American Industrial Safety Equipment Co.—36-page illustrated catalog describes goggles, spectacles, helmets, face shields, lenses, plates and other items in Eye-Gard and Body-Gard line of protective equipment. Each page is made up so that user can identify easily the application of each product and its construction features.

57. Hose Couplings

Snap-Tite, Inc.—Illustrated monthly publication entitled "Snap-Tite Bulletin" is devoted to information on uses of hose couplers in industry. Engineering data and price lists are periodically given for many of 200 types of hose couplers manufactured.

58. Testing Instrument

Sperry Products, Inc.—4-page illustrated bulletin No. 50-105 explains principle, operation and application of type UR Reflectoscope ultrasonic instrument for instantaneously locating defects in metals and other materials by use of single searching unit.

59. Industrial Truck Batteries

Gould Storage Battery Corp.—8-page illustrated catalog No. GB-1055 is designed to aid purchasing agents, plant engineers and battery-room foremen in selecting correct lead-acid storage batteries for industrial trucks. Engineering specifications for batteries of many different sizes and capacities are provided as well as recommended procedures for charging and handling.

60. Ventilators & Louvers

Burt Mfg. Co.—12-page illustrated catalog form No. SPV-101-C discusses design and structural features and presents performance and dimension data on continuous ridge, gravity, ball-bearing revolving and fan ventilators. Also covered are ventilator dampers and controls, ventilator bases and wall louvers.

ADDITIONAL INFORMATION?

For additional information on any of the items described under "New Equipment and Supplies", "Trade Publications" or "Helpful Literature" in this issue — simply circle their corresponding item numbers on one of these cards.

FIRST CLASS
PERMIT No. 34.0
(Sec. 510 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

THE FOUNDRY
Penton Building
CLEVELAND 13, OHIO

Reader's Service Dept.

1	21	41	61	81	101
2	22	42	62	82	102
3	23	43	63	83	103
4	24	44	64	84	104
5	25	45	65	85	105
6	26	46	66	86	106
7	27	47	67	87	107
8	28	48	68	88	108
9	29	49	69	89	109
10	30	50	70	90	110
11	31	51	71	91	111
12	32	52	72	92	112
13	33	53	73	93	113
14	34	54	74	94	114
15	35	55	75	95	115
16	36	56	76	96	116
17	37	57	77	97	117
18	38	58	78	98	118
19	39	59	79	99	119
20	40	60	80	100	120

THE FOUNDRY 1-50
Penton Building, Cleveland 13, Ohio

Please send literature or detailed information on subjects circled at left to—

NAME TITLE

COMPANY

PRODUCTS MANUFACTURED

ADDRESS

CITY AND STATE

This card MUST be completely filled out. Please TYPE or PRINT.

61. Industrial Lift Truck

Hyster Co. — 16-page illustrated form 1016F describes Hyster 40 industrial lift truck mounted on pneumatic tires. Having 4000-lb capacity, gas-powered unit can be used to hoist and transport materials indoors and outdoors and is built around unit power package that combines engine, clutch, transmission, differential and brakes in compact, easily serviced component.

62. Pneumatic Agitators

Eclipse Air Brush Co.—28-page catalog "Pneumix in Action" portrays air-powered explosionproof agitators for laboratory and production use. Publication lists applications, shows 17 typical installations in wide variety of industries, and gives details of 11 types of adjustable speed agitators. Formula is included for selecting correct agitator for any mixing job.

63. Magnetic Separators

Dings Magnetic Separator Co.—8-page illustrated bulletin No. C-5000A describes electric and nonelectric magnetic pulleys, nonelectric magnetic drums, triple-pole rectangular magnets, lifting magnets, nonelectric plate magnets and several other pieces of equipment. Data include brief specifications, lists of applications and features of equipment designed for separation of magnetic and nonmagnetic products.

64. Special-Purpose Equipment

May-Fran Engineering, Inc.—12-page illustrated bulletin G-100 includes brief descriptions of automatic sand blasting machine, annealing oven casing and tube drying rack for core drying. Other special-purpose equipment is covered for processing wide variety of products.

65. Induction Heating Unit

Lindberg Engineering Co.—2-page illustrated bulletin No. T-1420 describes LI-25 single-station model induction heating unit suitable for heating metals and other electrical conducting materials. It is capable of supplying 25 kw at approximately 450,000 cycles per second.

66. Pyrometer Indicators

Thermo Electric Co.—4-page illustrated instrument section No. 25 deals with multiple point pyrometer indicators designed for general industrial temperature measuring applications. Compact assembly of pyrometer and connector panel provides rapid means for indicating temperatures from one to six thermocouple locations.

67. Flexible Shaft Machines

Niles-Bement-Pond Co., Pratt & Whitney Div.—4-page illustrated circular No. 521 describes series M Kellerflex multiple speed flexible shaft machines for burring, filing, sanding, grinding, wire brushing or polishing.

68. Refractory Cement

Quigley Co. — 4-page illustrated bulletin 322F is descriptive of Q-Chrome neutral base refractory cement and air-setting bonding mortar for hot patching, reverberatory drossing and use in open hearths and anode and refining furnaces.

69. Copper Shot

American Wheelabrator & Equipment Corp.—4-page illustrated bulletin No. 69 explains ability of copper shot to produce good color, brilliance and finish in cleaning nonferrous metal parts. It is available in three sizes ranging from 0.016 to 0.073-in. in diameter.

70. Nonferrous Castings

Wellman Bronze & Aluminum Co. —16-page illustrated catalog No. 50 describing nonferrous castings and wood and metal pattern operations discusses such subjects as magnesium and aluminum alloys, polishing of aluminum, Well-Cast castings, copper-base alloys and pattern shrinkages of Ampco metal.

71. Scrap Handling Equipment

Harnischfeger Corp. — 4-page illustrated bulletin X-121 deals with various kinds of equipment for handling scrap. Depicted are overhead, truck and crawler cranes equipped with magnet, bucket and slings in all types of scrap handling service.

72. Machined Pattern Plates

Arthur E. Will—4-page pamphlet explains advantages and lists prices of machined cast aluminum pattern plates ranging in size from 8 x 14 to 20 x 20 in. All plates are cast with 1-in. flask margin all around plus large well shaped ears for flask pins and vibrator.

73. Blowers & Exhausters

Lamson Corp., Allen Billmyre Div. —20-page illustrated bulletin B-5 deals with centrifugal type blowers and exhausters which range from small fractional horsepower units to 250-hp size. Capacity tables are presented for heavy-duty cast-iron blowers and exhausters, high volume steel models, and single and multi-stage units.

74. Foundry Equipment

Freeman Supply Co.—256-page illustrated catalog No. 9 depicts and describes various types of equipment and supplies for use in pattern shop and foundry, including pine and mahogany pattern lumber and foundry flask and board lumber. Brochure offers condensed descriptions, specifications, capacities and list prices for entire line.

75. Stencil Marking Equipment

Marsh Stencil Machine Co.—Five illustrated leaflets discuss advantages of stencil marking and describe electric and hand operated stencil machines, fountain brush, felt tip fountain marker, pocket marker, stencil inks and adjustable brass stencils.

1	21	41	61	81	101
2	22	42	62	82	102
3	23	43	63	83	103
4	24	44	64	84	104
5	25	45	65	85	105
6	26	46	66	86	106
7	27	47	67	87	107
8	28	48	68	88	108
9	29	49	69	89	109
10	30	50	70	90	110
11	31	51	71	91	111
12	32	52	72	92	112
13	33	53	73	93	113
14	34	54	74	94	114
15	35	55	75	95	115
16	36	56	76	96	116
17	37	57	77	97	117
18	38	58	78	98	118
19	39	59	79	99	119
20	40	60	80	100	120

THE FOUNDRY **1-50**

Penton Building, Cleveland 13, Ohio

Please send literature or detailed information on subjects circled at left to—

NAME TITLE

COMPANY

PRODUCTS MANUFACTURED

ADDRESS

CITY AND STATE

This card MUST be completely filled out. Please TYPE or PRINT.

FIRST CLASS
PERMIT No. 34.9
(Sec. 510 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

4c POSTAGE WILL BE PAID BY—

THE FOUNDRY
Penton Building
CLEVELAND 13, OHIO

Reader's Service Dept.

(*Continued from page* 191)

high as 40,000 psi, permitting strain increments of only 2×10^{-6} in. per in. of the 6-in. gage length of a standard 0.356-in. diam specimen. These increases in length are detected by a highly sensitive extensometer with electric contacts that close a 6-volt relay circuit and thus operate a ¼-hp motor to reduce the load enough to open the contacts again and to maintain a substantially constant strain. The recorder produces a curve of stress vs. time on a flat chart slightly less than 10 in. wide.

For More Details Circle No. 9—Page 193

Truck Attachment: Yale & Towne Mfg. Co., Philadelphia Division, 4530 Tacony St., Philadelphia 24—Attachment for battery-powered hand trucks permits handling cer-

tain types of commodities without the use of skids or pallets. To pick up loads, the truck is maneuvered so that the load is between the forks; the operator then manipulates a lever which causes the forks to grasp the load in a pincher-like movement. The forks then are lifted and the load transported or tiered as desired. The tilting truck has a capacity of 3750 lb, travels at 2 mph under full load, and the mast tilts a full 21 degrees in 10 seconds to center the load. Overall dimensions of the truck, not including forks, are 67¾ in. long by 35 in. wide. Overall mast height is 83 in.; fork elevation is 56½ in.

For More Details Circle No. 10—Page 193

Die Lubricant: G. W. Smith & Sons Inc., 5400 Kemp Rd., Dayton 3, O.—Lubricant for pressure die casting dies was developed to prevent scoring and sticking and enable easy ejection of castings from the die. Applied with brush or spray as required, the lubricant is said not to stain the casting and to assure good surface finish on the casting. The compound leaves no carbon, gum, or other re-

SERVICE NETWORK

● The ten offices that comprise the Hickman, Williams network are staffed by foundry commodity experts who are trained to give you efficient and helpful service.

For quick, intelligent action, contact the office nearest you.

Serving the metal industry with
FERRO PHOSPHOROUS ★ FLUORSPAR ★ SHOT
GRIT ★ PIG IRON ★ FLUORITE ★ COAL ★ COKE
SAND ★ CLAY ★ SILVERY IRON ★ BENTONITE
FERRO ALLOYS ★ SPIEGELEISEN
CLINKERED — RAW DOLOMITE

Hickman, Williams & Co.
(INCORPORATED)
CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS
Established 1890

1 Man does 30 Men's Work!

WITH COMBS *Gyratory* FOUNDRY RIDDLES

SIFT • MIX • FLUFF AREATE

Moulding and Core Sands Medium Fine, Coarse, and Sticky Materials.

TYPE CS

Automatic Discharge of gaggers, refuse, etc. Lets man do continuous shoveling. Only $280 f.o.b.

TYPES "V" and "V5"

Type "V" with 24" sieve can do the work of 10 men—Type "V5" with 36" sieve, the work of 30—and all at a power cost of less than 1c an hour!

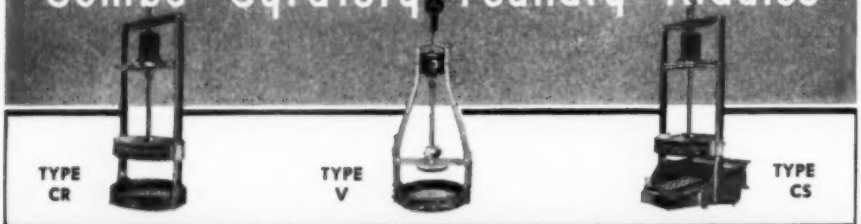
Type "V5" Complete $400.00

Cleaner, faster riddling, with a saving of up to 97% on labor costs is yours with a Combs Gyratory Riddle. Sturdy, simple to operate.

Quick removable steel-rim sieves. . .enclosed, completely dustproof, fractional horsepower motor. . .ball bearing action. . .prompt delivery from your Foundry Supply House.

SEND FOR FREE DESCRIPTIVE FOLDER

Combs • Gyratory • Foundry • Riddles

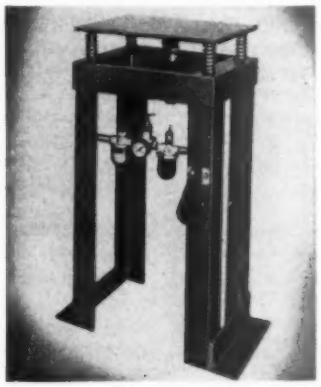


GREAT WESTERN MANUFACTURING CO.
LEAVENWORTH, KANSAS, U.S.A.

sidue in the die and therefore eliminates frequent die cleaning. The lubricant is nontoxic and causes no objectionable fumes or smoke, it is claimed.

For More Details Circle No. 11—Page 193

Vibrating Table: Cleveland Vibrator Co., 2788 Clinton Ave., Cleveland 13—Pneumatic powered vibrating table has a solid 12 x 18 x ½-in. sheet steel platform which can be replaced with a wood platform or various types of screens to facilitate handling a wide range of applications. A maximum speed of 1950 vibrations per minute is provided, intensity of the vibrations being controlled by the



air pressure. Maximum operating speed is obtained on 80 psi line pressure. Heavy duty steel springs float the platform to prevent the transmission of vibration to the floor. Steel pins limit lateral movement of platform. Standard equipment includes an air line filter, an air line lubricator and a pressure control regulator for maximum safety of operation.

For More Details Circle No. 12—Page 193

Light Reflector: Eagle-Picher Co., Main & Court Sts., Cincinnati 1—Dry, granular, high light reflective material which is spread on plant floors to help keep them dry is said to retain its reflective ability even when soaked with oil or water. It increases the amount of light in usually dark plant areas, and, while absorbing fluids, the material also continues to provide a firm surface for wheel or foot traffic within a plant. When swept up after being fully saturated it leaves a dry, clean floor, it is claimed.

For More Details Circle No. 13—Page 193

Refractory Mortar: General Refractories Co., 1520 Locust St., Philadelphia—New mortar is formulated for use in construction with silica brick and for repairs to all silica brick construction. The mortar

(*Continued on page* 198)

NOW READY

A New Edition of

GATES AND RISERS FOR CASTINGS

by Pat Dwyer

Gates and risers cannot be eliminated, but they can be used to advantage. The modern foundryman recognizes in gates and risers a source of many headaches . . . a source of imperfect castings and loss of profits. This new book by Pat Dwyer, engineering editor of THE FOUNDRY, thoroughly covers the problems that arise in design and use of gates and risers. Detailed examples of gates and risers for practically all types of ferrous and nonferrous castings are described and illustrated.

"GATES AND RISERS FOR CASTINGS" tells you how and why. More than 300 different subheadings and 247 illustrations give you practical methods of gating gray iron, steel, malleable iron, aluminum, brass and bronze castings. Practically every problem that a foundryman can encounter is covered in an easy-to-read text that is accompanied by detailed drawings and illustrations of the "how-to-do-it" type.

"GATES AND RISERS FOR CASTINGS" is now in its third edition and has found wide acceptance among all classes of foundrymen. New material in this third edition includes description of sleeves and pads; knockoff risers; pouring through risers; permanent molds for aluminum; formulas for centrifugal pouring speeds; magnesium casting systems; vacuum systems; blind risers; risers under pressure; thermotomic feeding; malleable symposium; and precision casting principles.

As a source-book of information on casting defects and what to do to eliminate them, "Gates and Risers for Castings" has no equal. A complete cross-index permits ready reference to any section . . . no matter what your question, you will find an answer immediately in "Gates and Risers for Castings."

"GATES AND RISERS FOR CASTINGS"

(Third Edition)

By Pat Dwyer, engineering editor of THE FOUNDRY, 6 x 9 inches, red cloth bound board covers; 384 pages, 247 illustrations, 31 chapters, 5 sections; fully cross-indexed; $6.00 postpaid. Hundreds of copies of this book are already doing daily service in every type of foundry. Use the convenient coupon to order yours today.

Book Department, THE PENTON PUBLISHING CO., F 1-50
Penton Building, Cleveland 13, Ohio

Send me . . . copies of "GATES AND RISERS FOR CASTINGS" by Pat Dwyer.

☐ On ten days trial for free examination, following which I will either pay for the book at $6.00, plus postage, or return it in good condition.

☐ C. O. D.

☐ Remittance enclosed* in which case the book will be sent postpaid.

SIGNED _____ TITLE _____

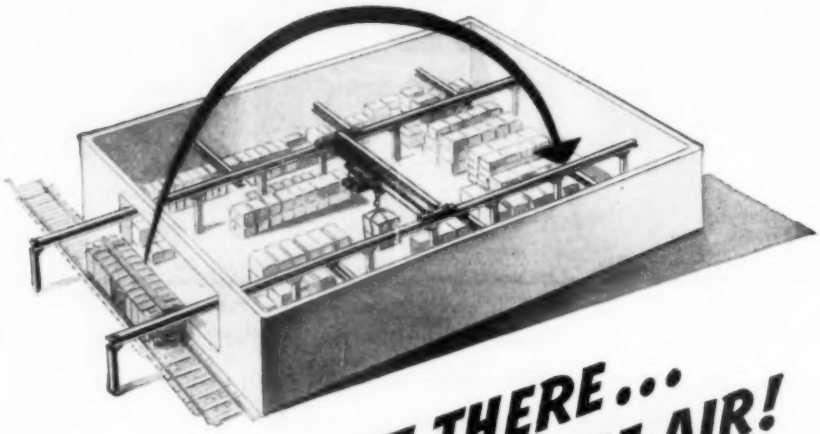
COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

*On orders for delivery in Ohio please add 18c to cover state sales tax.

FOR GREATEST ECONOMY OF SPACE AND MANPOWER



PUT IT THERE... THROUGH THE AIR!

A quick hook-on to a pallet, basket or standard sling and the load is whisked away—cutting across occupied floor space—straight to the spot where you want it.

It's smart, and thrifty to use "through the air" transportation as widely as you can in plants and warehouses. Compare this method for overall cost, efficiency, maintenance and safety before you allow other means of transfer to overlap the service that is best performed by cranes and hoists!

Let the Shepard Niles specialist break your problem down for you—he's experienced, skillful and he has the maximum number of sizes and types in his product line.

Shepard Niles

CRANE & HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads

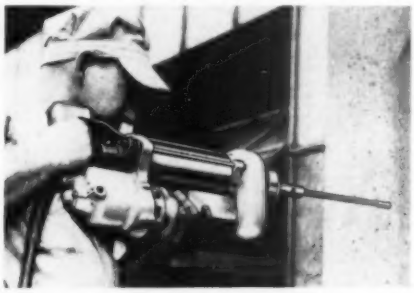
360 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

(*Continued from page* 196)

is composed of high purity silica and special colloidal bonding materials which are said to fuse at high temperatures to form a high refractory bond between the silica particles. It also is claimed that the mortar has a high suspension characteristic which is advantageous in trowelling, dipping or spraying operations.

For More Details Circle No. 14—Page 193

Electric Hammer Drill: Syntron Co., 540 Lexington Ave., Homer City, Pa.—Electric drill is designed to hammer and rotate the drill bit at the same time. The tool will drill holes up to 2 in. in diam, is of electro-magnetic design with a free-striking piston, has an automatic safety clutch on the rotating drive that will slip if the bit binds or gets stuck



in its hole, weighs 38½ lb, and is available for 110 or 220 v ac operation. The percussive hammering can be stopped while the bit continues to rotate to clean the hole. The company also has developed a new line of drill steels to use with these hammers. They have carbide cutting edges and spiral flutes that make possible the drilling of the hardest rock and that clean the cuttings out of the hole as the hammer rotates the drill steel.

For More Details Circle No. 15—Page 193

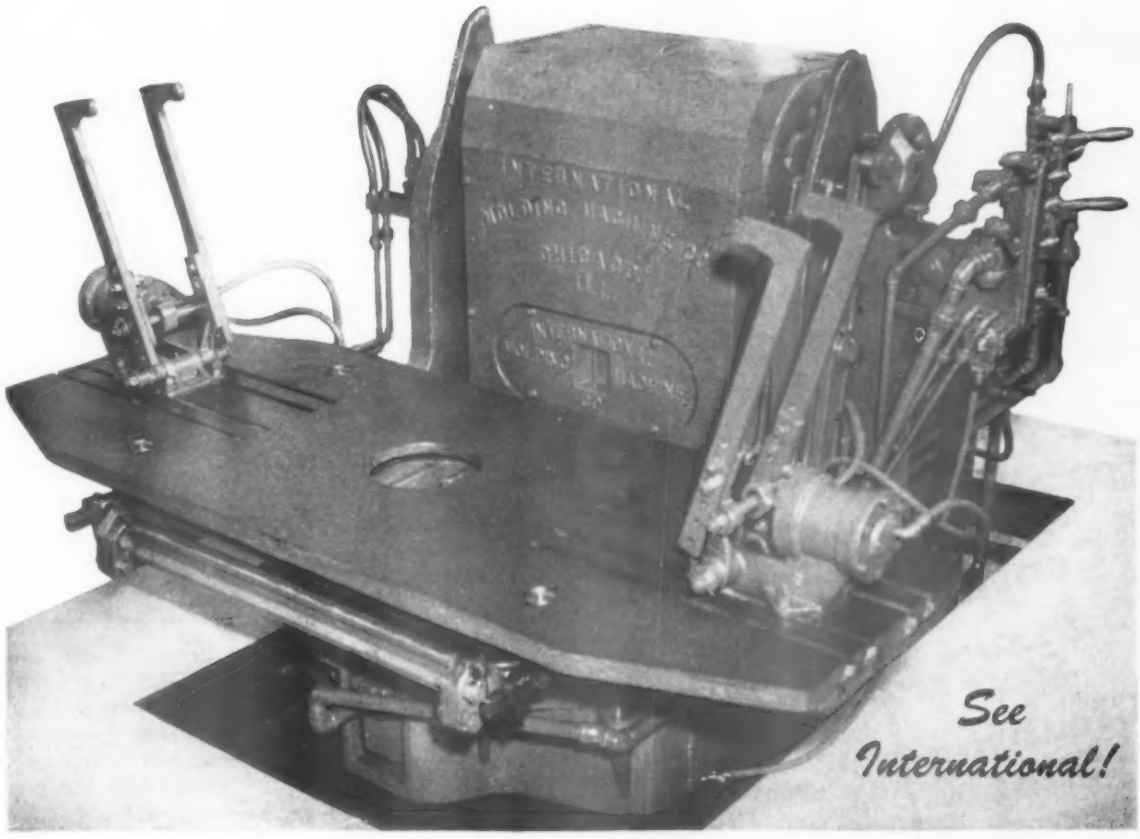
Hoist Equipment: General Electric Co., Control Division, Apparatus Dept., Schenectady 5, N. Y. —A new direct current two-shoe two-magnet brake designed for use on steel mill drives, cranes, hoists, bridges, conveyors, and for general marine service consists of a malleable iron frame, two self-aligning shoes which pivot on spherical bearings, two armatures pivoting on sealed graphite bearings, two symmetrical E-type magnets with cast-in coils, and a ventilated wheel. A quick-release mechanism permits removal of wheel, horizontally or vertically, or changing brake linings without disassembling any part. A new direct-current crane hoist control offered by the company is intended for

(*Continued on page* 200)

For LARGE Jolt - Rollover - Draw Work

INTERNATIONAL

TYPE F MACHINE



INTERNATIONALS are made in 90 Standard Types and 1400 Different Sizes. Special Designs to meet your special requirements may be developed for you. Foundries maintaining High Production are equipped with INTERNATIONALS. "There's a type for Every Job."

INTERNATIONAL FOUNDRY ENGINEERS, trained with practical experience of the working needs in the modern foundry, are ready to consult with you about your particular mechanical problems.

INTERNATIONAL MOLDING MACHINE CO.

LA GRANGE PARK, ILLINOIS • (Suburb of Chicago)

ANOTHER BIG STRIDE FORWARD!

and amazingly superior steel abrasives

1 **20th Century** *Drawn Steel* **Cleaning Shot**

2 **20th Century** *Drawn Steel* **Peening Shot**

These new abrasives are made of hard drawn steel wire, by one of the older and most dependable manufacturers of metal abrasives.

EXTREMELY TOUGH AND DURABLE. They outlast conventional hard iron shot 8 to 1, and cast steel shot at least 2 to 1. Freight and handling costs are greatly reduced.

20th Century Drawn Steel Peening Shot makes a practical process of the shot peening operation because the pellet size and mass remain uniform many times longer than with other types of shot.

Why not SEE what these new abrasives will accomplish in your production? SEND A TRIAL ORDER TODAY.

•

A SIZE FOR EVERY NEED

THE CLEVELAND METAL ABRASIVE CO.

Main Office and Plant: 887 East 67th Street, Cleveland 8, Ohio

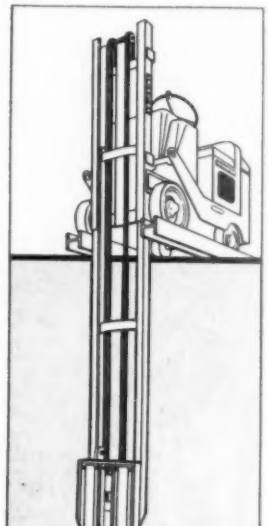
Howell Works—Howell, Michigan

(*Continued from page* 198)

use on whirley, revolver, gantry, and overhead cranes. It provides power hoisting and power dynamic lowering, depending upon the requirements of the load on the hook. The change from power to dynamic braking lowering is inherent in the control and is independent of either the operator or any particular control device. The hoist control also is said to eliminate both overshoot and down drift.

For More Details Circle No. 16—Page 193

Lift-Lower Truck: Towmotor Corp., 1226 East 152nd St., Cleveland 10—New fork lift truck is engineered to lower and raise heavy loads between balcony storage areas and first floor production line. A special nontilt mast and carriage assembly are designed to permit the load carrying forks to be lowered 98 in. below balcony floor level. Mounted on a standard company fork lift truck, the elevator unit has a lifting and lowering capacity of 2000 lb. Full capacity loads can be lifted from first floor to balcony floor. The truck can be furnished in various capacities and heights of lift.



For More Details Circle No. 17—Page 193

Combustion Safeguard: Bristol Co., Waterbury 20, Conn.—Instrument protects gas-fired industrial heating equipment from danger of gas explosions during ignition, operation, and shut-off. If the normal operation fails at any step, the lighting-up cycle stops and closes any valve that has been opened. If, at any time, the power supply should fail, the entire system is shut down in a safe manner. The safeguard shuts off all gas, lights signal, sounds alarm, and makes relighting impos-

sible if any tube or relay in the unit fails to function normally. In order to avoid unnecessary shutdowns it prevents gas shut off due to momentary flame flicker, in accordance with accepted insurance company standards.

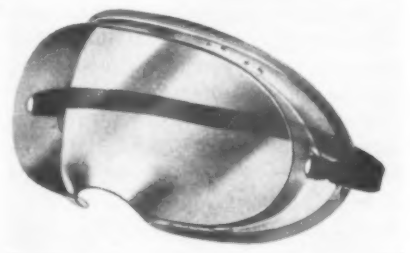
For More Details Circle No. 18—Page 193

Ramp: Barrett-Cravens Co., 4609 South Western Blvd., Chicago 9—Portable ramp, with adjustable height

feature, compensates for the differences between dock heights and the varying bed heights of trucks and trailers. Other applications include: Furnishing a gradual incline from shipping dock or truck bed to street level; transferring loads from truck to truck, or from freight car to truck, and bridging area-ways between buildings. A mechanical screw-type lifting gear provides a 12-in. variation in height at one end of the ramp. This feature allows the ramp to move vertically with the truck bed if springs and tires deflect under heavy loading, keeping ramp and truck bed aligned. The ramp pictured is 5 ft wide, 14 ft long and has a capacity of 6000 lb. A 10-ft length also is available. Minimum height at adjustable end is 41 in.; maximum raised height is 53 in.

For More Details Circle No. 19—Page 193

Safety Goggle: Chicago Eye Shield Co., 2336 Warren Blvd., Chicago 12—Safety goggle, weighing 0.97 oz, has an injection molded, non-



flammable plastic frame and is designed to provide full protection from impact, dust, flying sparks and chips. Ample air space and ventilation prevent fogging, while the large frontal area provides a wide range of vision. Another feature is the adjustable plastic headband. The goggle is avail-

Get Better Cleaning with less abrasive
Pay Less for freight and handling
Save by reducing equipment wear 50% to 75%
Turn to this Amazing New Shot and Grit.
Proved in Leading Foundries!
20th CENTURY
NORMALIZED
20th Century Normalized lasts at least twice as long as ordinary shot and grit. It is stress relieved.
There is practically no shattering.
A TRIAL IS CONVINCING. Send your order today.
Licensed Under
U. S. Patent No. 2184926.
U. S. Application No. 619602

THE CLEVELAND METAL ABRASIVE CO.

Main Office and Plant: 887 East 67th Street, Cleveland 8, Ohio

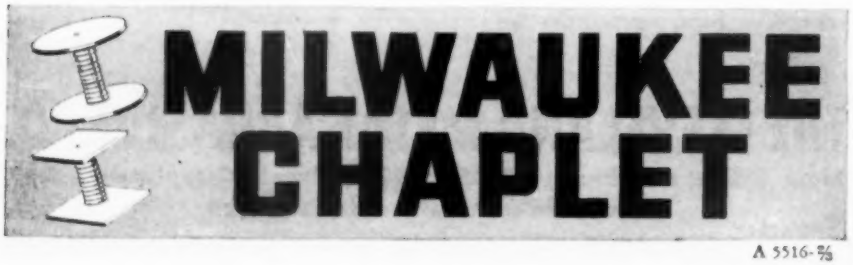
Howell Works—Howell, Michigan

Originally developed to expedite the casting of motor blocks and heads, MILWAUKEE "Motor" Chaplets are now used extensively in producing light sectioned castings of all kinds. They are especially recommended for light castings which are to be subjected to gas, steam, oil or water pressure.

These light, double headed (square or round) Chaplets have the famous "MILWAUKEE Thread Stem" which permits the use of a *heavier stem* . . . resulting in the double benefit of a well secured core and a pressure tight casting. Scrap losses due to "leakers" are practically eliminated.

Milwaukee Motor Chaplets are available in plain, coppered or tinned finish; also in aluminum. Write for samples and prices, or refer to Page 9 of your Milwaukee Chaplet Catalog.

MILWAUKEE CHAPLET & MFG. CO.
1025 SOUTH 40TH STREET • MILWAUKEE 4, WISCONSIN



A 5516-⅝

able in clear, light green or dark transparent frames. The new design is said to permit comfortable wear over most types of personal glasses without interference.

For More Details Circle No. 20—Page 193

Test Core Maker: Precision Scientific Co., 3737 West Cortland St., Chicago 47—Transverse test core maker for preparing standard test cores 1 x 1 x 8 in. consists of a cast iron base with four vertical rods on which a wooden block slides. A steel plate and two pins on the block hold the coreboxes in position; two clamps hold the coreboxes and hopper to the moving block. To make a test

core, the steel core plate is placed below the cavity in the corebox, and the hopper, containing the core sand, is clamped in position on the wooden block. The block then is raised and dropped ten times to make the core.

For More Details Circle No. 21—Page 193

Metal Cleaner: Special Chemicals Division, Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7—Compound for reverse current cleaning of zinc base die castings prior to electroplating is composed of balanced anhydrous alkaline ingredients plus a combination of synergistic surface active agents. Improved cleaning is claimed because solution temperatures may average between 180 and 190° F.

For More Details Circle No. 22—Page 193

Spectrographic Analysis: Applied Research Laboratories, 4336 San Fernando Rd., Glendale 4, Calif. —Adaptors for converting the company's standard spectrograph into a direct reading instrument have, in addition to the basic circuits, all of the auxiliary circuits found to be successful in the company's original direct reading quantometer. Also a

new spectrographic spark-arc source unit has been designed to provide the routing control laboratory with a relatively inexpensive dual purpose source. The unit is said to fill the requirements for the precision analysis of elements at the higher concentrations as well as high sensitivity trace analysis.

For More Details Circle No. 23—Page 193

Crane Block: American Hoist & Derrick Co., 63 South Robert St., St. Paul 1—Low head crane block, in capacities from 10 to 50 tons has been designed for all types of hook work. The forged hook operates on tapered roller bearings and the cast steel sheaves are equipped with high

load bearings. Lubrication is necessary only once each 2000 hours, it is said. Fittings are provided for standard grease gun use.

For More Details Circle No. 24—Page 193

Paint: Lowebco Inc., 1525 East 53rd St., Chicago 15—Synthetic coating for interior and exterior painting of concrete and metal is said to stand up under the extreme temperature generated in metal treating work and not to crack, peel, chip or dust off. It has withstood temperatures up to 2000° F when used on furnaces. Additional claims for the coating are that it withstands repeated washing; it is immune to alkali; it resists sulphuric acid up to 50 per cent dilution and nitric acid up to 10 per cent; it is unaffected by caustic detergents. It is available in a variety of colors.

For More Details Circle No. 25—Page 193

Solder Material: Eutectic Welding Alloys Corp., 40 Worth St., New York 13—Universal cast iron filler package which embodies properties similar to those required in large scale production, is designed for use as a solder. The unit con-

HAUSFELD FURNACES

FOR "ALL-OUT" PRODUCTION IN NON-FERROUS FOUNDRIES

Provide the Utmost in Speed Production and Safety

FURNACES FOR
BRASS • ALUMINUM • MAGNESIUM
AND ALL OTHER
NON-FERROUS ALLOYS

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

Prompt shipment—unlimited quantities now available to foundries from BAROID—the world's largest producer of Bentonite. Our modern plants are geared to fulfill every requirement of the foundry trade.

From THESE APPROVED DISTRIBUTORS

American Cyanamid Co.
New York, New York

The Asbury Graphite Mills, Inc.
Asbury, New Jersey

Barada & Page, Inc.
Kansas City Missouri (main office)
Also—(Branches)
Tulsa, Okla.
Oklahoma City, Okla.
Wichita, Kansas
Dallas, Texas
Houston, Texas
New Orleans, La.

O. W. Bryant Core Sands, Inc.
McConnellsville, New York

Canadian Industries, Ltd.
Montreal, Quebec, Canada
(all branches)

Casco S. de R. L.
Mexico, D. F.

The Foundries Materials Co.
Coldwater, Michigan
Also Detroit, Michigan

Foundry Service Company
North Birmingham, Alabama

Foundry Supplies Co.
Chicago, Illinois

Thomas H. Gregg Company
Milwaukee, Wisconsin

Independent Foundry Supply Co.
Los Angeles, California

Industrial Foundry Supply Co.
San Francisco, California

Klein-Farris Co., Inc.
Boston, Massachusetts
New York, New York
Hartford, Connecticut

LaGrand Industrial Supply Co.
Portland, Oregon

Marthens Company
Moline, Illinois

Carl F. Miller & Co.
Seattle, Washington

Pennsylvania Foundry Supply & Sand Co.
Philadelphia, Pennsylvania

Robbins & Bohr
Chattanooga, Tennessee

Smith-Sharpe Company
Minneapolis, Minnesota

Southwest Foundry Supply Co.
Houston, Texas

Mr. B. J. Steelman
Chicago, Illinois

Stoller Chemical Co.
Akron, Ohio

Wehenn Abrasive Co.
Chicago, Illinois

Mr. Walter A. Zeis
Webster Groves, Missouri

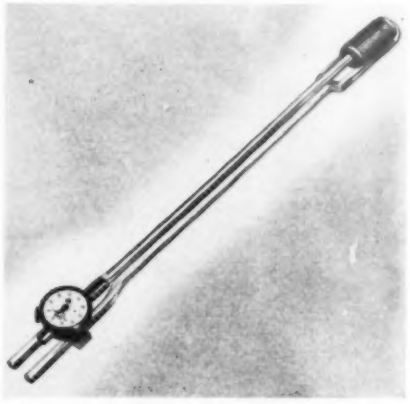
BAROID
SALES DIVISION
NATIONAL LEAD COMPANY

BENTONITE SALES OFFICE:
RAILWAY EXCHANGE BLDG.
CHICAGO 4 • ILLINOIS

tains a roll of alloy and a jar of flux, both packed in one container. The alloy has a bonding temperature of 500° F, and is said to bond on extremely rusty, old metal. Intended for sealing leaks, filling in holes and adding material to old and new base metals, this alloy is used in conjunction with a specially active flux for both ferrous and nonferrous work, excepting aluminum.

For More Details Circle No. 26—Page 193

Thermal Expansion: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Instrument measures thermal expansion in sands, ceramics, and metals. Instrument is constructed of fused quartz with a sensitive dial



indicator attached. Samples may be up to 1⅛-in. in diam. and 3 in. long. Measurements at temperatures up to 2500° F are obtained by inserting the instrument horizontally into any suitable furnace.

For More Details Circle No. 27—Page 193

Core Tunnel: Induction Heating Corp., 181 Wythe Ave., Brooklyn 11, N. Y.—Baking tunnel for dielectric baking of cores has a capacity of 375 lb of cores per hour and is capable of handling cores up to 16 in. wide by 7 in. high. The unit has a variable speed dial feed, adjustable electrodes and a complete blower exhaust system. It is designed for the small foundry and is so arranged that both loading and unloading may be handled by the same coremaker.

For More Details Circle No. 28—Page 193

Air Gun: Gilmour Mfg. Co., Somerset, Pa.—Newly developed air blow gun is a companion item for the company's water nozzle. It is made of durable, noncorrosive specially alloyed metal and has a precision tooled, all brass valve arrangement which is said to be leak proof. An automatic shut-off helps to conserve air. A handy lock keeps nozzle valve open for an extended period of time when desired.

For More Details Circle No. 29—Page 193

Flasks and Rigging

(*Continued from page* 73)

there is not as much time saved by their use as there is when the flasks are used on jolters, as described previously with reference to hand and machine molding methods.

For use on large molding machines and for heavy floor work, cast iron and cast steel flasks may be employed. These may be purchased or made by the foundry. In normal times cast iron is the cheaper material, but if the foundry makes no iron castings flasks may be made on the premises out of steel, which can be remelted when no longer serviceable. The cost of the flasks under these circumstances is made up of the difference between the cost of metal in the ladle, and that of scrap metal, plus molding, cleaning and machining charges. Quite aside from the question of first cost, however, cast steel flasks are in the long run preferable to cast iron ones, because of their greater strength and toughness, which makes them much less likely to be broken in handling and at the shakeouts.

Grids Cast Integral

Whenever possible, it is desirable to cast complete copes and drags in one piece, so that there are no joints to weaken the flasks. Grids such as were described previously are sometimes cast integral with the drag flasks, and sometimes are made in one or more sections and bolted on. The former is by far the better practice for flasks to be used on jolters since bolts holding sections of flask together, or used to hold grids in position, frequently work loose under the jarring action of a jolter, and require constant attention.

As mentioned, it is often impossible to use integral grids on drags used for hand molding, because of the difficulty of reaching all parts of the job properly, if the rammers have to be poked through the grid openings. Consequently, grids used on flasks that are to be hand rammed are generally bolted in place after ramming is nearly completed. Unless very carefully designed, with large openings suitably located with reference to the pattern, grids interfere with the operation of slingers also, and flasks to be used with slingers in a jobbing foundry will often require removable grids.

The same considerations apply to cope bars as well as to grids, so that whenever possible the latter are also cast integral with the flask. This means, however, that the flask

Schmieg CENTRI MERGE

Still the Best Answer to your FOUNDRY DUST and FUME PROBLEM

Here are Several Reasons Why

CENTRI-MERGE is *COMPLETELY* automatic in every phase of operation, *COLLECTS* dust and fumes as soon as they occur, *CLEANS* by high pressure water action, *DISPOSES* by mechanical conveyor. Dust and fumes are forced back on a stream of air to collection unit, washed and scrubbed from the air into tank below, permanently trapped under water for quick disposal as sludge.

1. **CENTRI-MERGE** greatly reduces heating cost by re-circulating cleaned air in many cases, occupies a minimum of valuable floor space, is easily installed.
2. **CENTRI-MERGE** gives non-fluctuating cleaning efficiency every minute of the day, collects and disposes of dust and fumes immediately.
3. **CENTRI-MERGE** operates at constant efficiency during many years of trouble-free service.
4. **CENTRI-MERGE** eliminates health or fire hazard in dust control by its automatic removal as sludge.
5. **CENTRI-MERGE** is always dependable, never requires a shutdown during working hours for cleaning or routine maintenance.
6. **CENTRI-MERGE** is engineered for minimum maintenance expense, is a compact, self-contained unit, constructed for flexibility of arrangement to suit plant requirements.

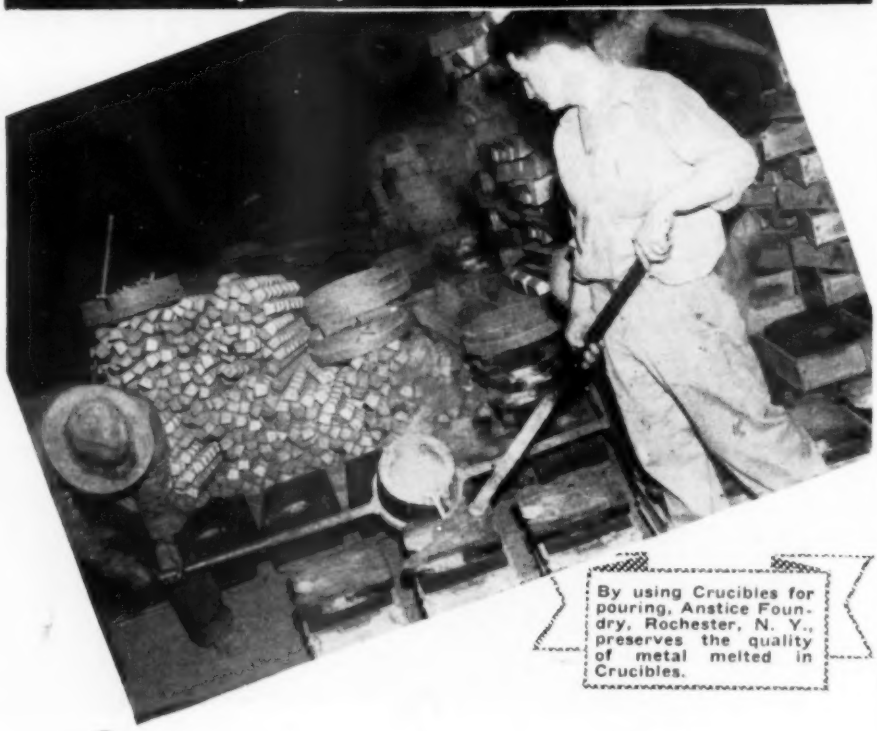
Consult Schmieg Engineers Today

THE *best* AIR PURGE *is* CENTRI MERGE

Schmieg INDUSTRIES INC.
Engineers & Manufacturers

302 PIQUETTE AVENUE • DETROIT 2, MICHIGAN

Use Crucibles for Carrying and Pouring



By using Crucibles for pouring, Anstice Foundry, Rochester, N. Y., preserves the quality of metal melted in Crucibles.

CRUCIBLES made of the same materials as the Crucibles you melt in are the most satisfactory vessel for carrying and pouring.

Carrying Crucibles eliminate cost of lining ladles.

Carrying Crucibles maintain the high quality of Crucible melted metal from the furnace to the molds.

Crucibles are self-cleaning. Metal and slag do not stick.

Crucible Melters Handbook is mailed free; write for it today.

can be used only for a limited number of casting designs, so that in the average jobbing foundry most flasks have separate cope bars, shaped to fit the jobs to be made, and bolted in position over the patterns by the flask gang, whose duty it is to rig up the flasks for the foundry.

When very large flasks are required, one-piece copes and drags are usually far too costly, since orders for big castings seldom call for more than one or two castings from a pattern, and it does not pay to make integral flasks of proper size for each job. For work of this sort, standard sections are kept on hand which can be bolted together to form flasks of any required size and shape. Fig. 16 shows the shape of standard parts of this sort, including the special corner pieces used to connect the sides and ends.

Bolt Sections Together

Variations in the depth are taken care of by using two, three or more sets of pieces, one on top of the other, bolted together through the flanges. With sections of 12 and 18-in. depths available, flasks can be made that vary in depth in stages of 6 in.—for instance, 12, 18, 24, 30, 36 in., etc. In putting up an assembly of this sort, it is necessary to "break joints" to the greatest possible extent, so that there will be no line of weakness extending from top to bottom of either the sides or the ends of the flask. When assembled in this manner, even a long flask will have ample strength to withstand the stresses set up when the rammed-up mold is lifted. If the flask is composed of only one tier of sections, however, the bolts in a long assembly will be subjected to very high stresses when the flask and its sand load is raised. This is especially true if the crane hooks are placed too far apart.

Rough calculations show that in a 30-ft long flask, 18 in. deep and 6 ft wide, rammed full of sand and supported by hooks at its ends, the maximum stress in the lower flanges is only some 2000 to 3000 psi, if the side members are made in one piece. If they are each built up of two or three sections, however, the bolts then are subjected to almost pure tension, which is greatest in those closest to the bottom flange of the flask, and least in the upper ones. In a 30-ft flask, ⅞-in. diam bolts with an effective cross-sectional area at the root of the threads of 0.4197 sq in. will be stressed to some 20,000 or 30,000 psi, at which is ten or fifteen times the stress in an integral member, and by far too high for safety. Any sudden shock, caused

for instance by the slipping of a crane hook, may result in a stress great enough to fracture the bolts and allow the flask to fall.

The author has known cases in which long flasks of this sort broke in two when they were lifted for rolling over due to the chain men setting the crane hooks too far apart. To be adequately strong a flask should be stiffened by plates laid across the joints on the inside, and bolted through the side members. If they are also tack-welded to the flask members at a number of points, so much the better.

Another possible arrangement is to use bars of the same width as the bottom flange of the flask, extending the full length and width of the assembly, and fastened through the lower flanges by means of bolts with counter-sunk heads. One sometimes see reinforcing members laid across the upper flanges of the flask and bolted through it at a number of places, but the additional stiffness thus secured is due chiefly to the shearing strength of the bolts that hold the reinforcing strip to the flask, and is nowhere nearly as great as that secured by inside plates or bars bolted to the bottom flange of the flask.

Pressure Becomes Great

Much more serious than the stresses involved in lifting large flasks, however, are those set up by the ferrostatic pressure of the liquid steel when the mold is poured. As the total depth of metal in the mold increases, this pressure becomes very great, and may even produce stresses beyond the strength of inadequately designed molds. Liquid steel weighs some 0.255 lb per cu in. so that the pressure at a depth of 1 ft below the surface of the metal is about 3.1 psi, and so long as the steel remains molten, this pressure is equal in all directions.

When a casting such as that shown in the accompanying sketch (Fig. 15) is poured in a flask built up of 18-in. sections of design similar to that illustrated, the pressure in the lowest sections of flask is obtained by multiplying the average depth below the surface of the steel forming the part of the casting in that section, 16½ ft, by 3.1 psi, and is therefore approximately 51.2 psi. The area of liquid steel in the wider face of the portion of the casting included in that flask section is 96 x 18, or 1728 sq in., and the total lateral pressure on the flask is 1728 x 51.2 or 88,473 lb. In the case of flasks each 18-in. section of which is cast as a single piece, with a cross-sectional area of about 56 sq

May we assist you, sir?

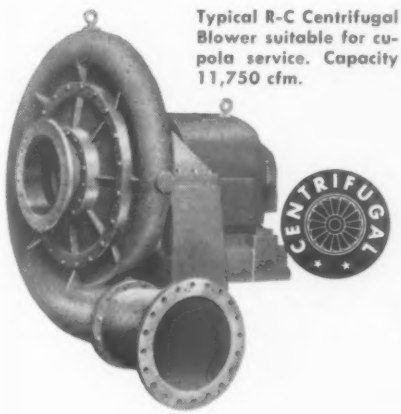
If you're on a merry-go-round about handling air or gas, *R-C dual-ability* can help you.

That's been our exclusive job for almost a century. We've developed the most extensive line of blowers, exhausters and gas pumps in the industry, with capacities from 5 cfm to 100,000 cfm.

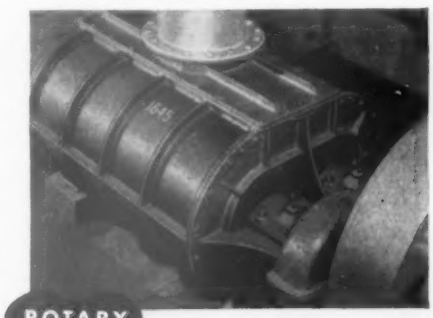
We're the only builders offering that *dual choice* of both Centrifugal and Rotary Positive equipment. Thus, without bias, we can suggest units that meet most closely the requirements of the work to be done.

For new installations or replacements, look to us for your needs. Alert engineering teams up with modern construction to insure long-time, satisfactory performance of R-C equipment.

ROOTS-CONNERSVILLE BLOWER CORPORATION
501 Madison Avenue, Connersville, Indiana



Typical R-C Centrifugal Blower suitable for cupola service. Capacity 11,750 cfm.



Rotary Positive Cupola Blower with V-belt drive, for melting gray iron and non-ferrous metals. Capacity 8,600 cfm.

ROOTS-CONNERSVILLE
BLOWER BUILDERS R-C SINCE 1854
ONE OF THE DRESSER INDUSTRIES

in., this pressure is resisted by a total of 112 sq in., so that the stress in the flask is only 790 psi.

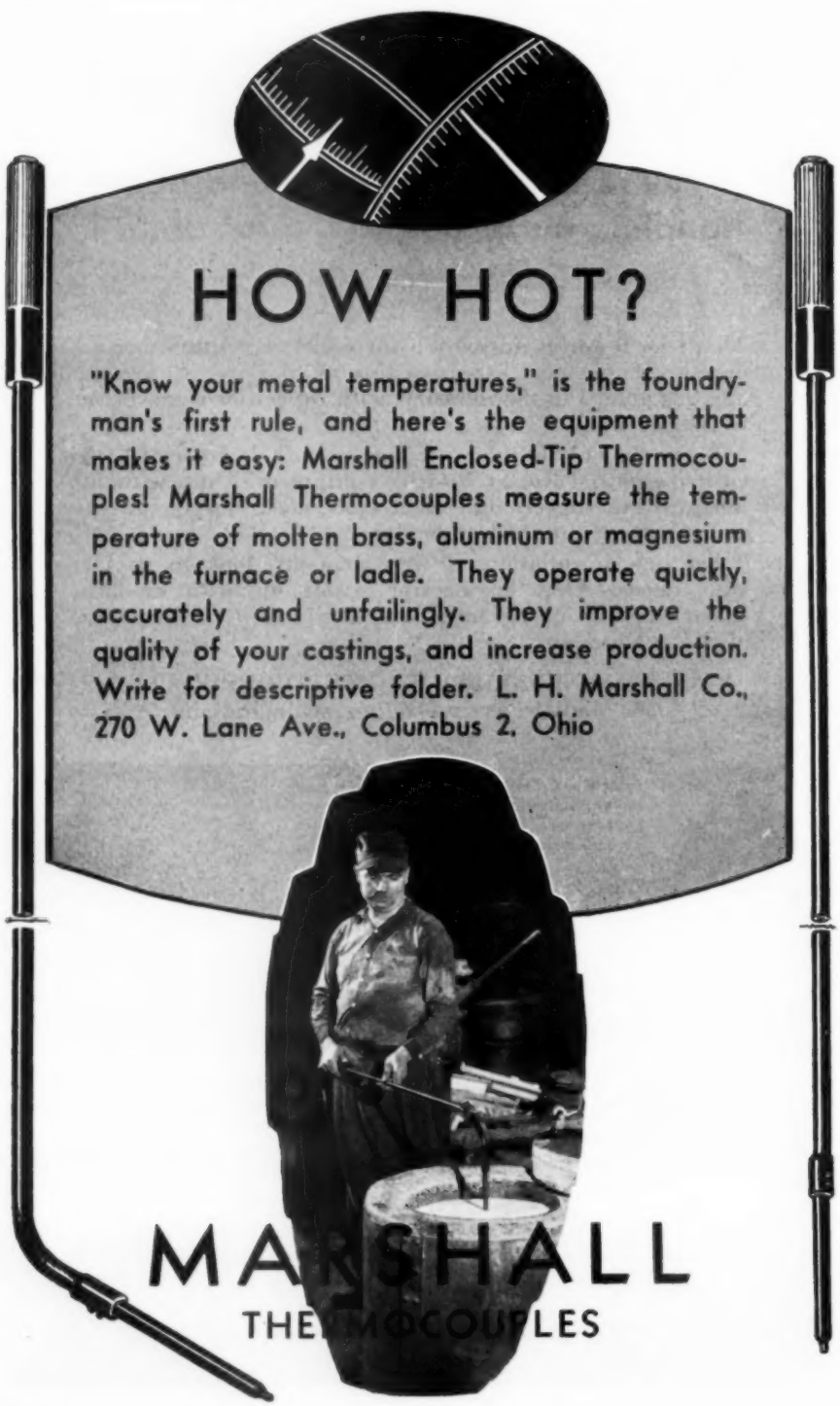
If bolted-up flask sections are used, however, the pressure must be resisted by the bolts, whose total cross-sectional area is much less than that of the flask sections, so that they are stressed to a much greater degree. In the design of flask shown in the illustration a total of 16 bolts (eight at each joint between corner pieces and end sections), must take the entire stress. Bolts ⅞-in. in diam have a cross-sectional area at the root of the thread of approximately 0.4197 sq in., and 16 of them a total area of 7.72 sq in. If the pressure is distributed equally, each bolt is subjected to a stress of some 11,460 psi from the ferrostatic pressure alone. Adding to this the tensile stress set up in the bolts when the nuts are tightened, it is obvious that they are being subjected to quite high total stresses, and that such a mold assembly should be reinforced by heavy binders and tie-rods, or set in a pit and backed up with bonded sand rammed tightly into the space between flask and pit wall.

Sand thus rammed in can be counted upon to have a bearing strength of at least 3000 lb per sq ft since in designing column footings, average firmly packed soil is usually rated as having a bearing strength of about 6000 lb per sq ft. In addition to its value is reinforcing the mold against the bursting pressure of its contents, sand thus packed in has the further function of stopping any run-out that may occur.

(*To be continued next month*)

Sources of Illustrations

Fig. 1—Christiansen Corp., Chicago
Figs. 2 and 3—Hines Flask Co., Cleveland
Figs. 4, 5, 6 and 7—Adams Co., Dubuque, Iowa
Fig. 8—Shanafelt Mfg. Co., Canton, O.
Figs. 9 and 13—Sterling Wheelbarrow Co., Milwaukee
Fig. 10—Industrial Fabricating Inc., Eaton Rapids, Mich.
Fig. 11—Black, Sivalls & Bryson Inc., Kansas City, Mo.
Fig. 12—Truscon Steel Co., Cleveland
Fig. 14—Fremont Flask Co., Fremont, O.


HOW HOT?
"Know your metal temperatures," is the foundryman's first rule, and here's the equipment that makes it easy: Marshall Enclosed-Tip Thermocouples! Marshall Thermocouples measure the temperature of molten brass, aluminum or magnesium in the furnace or ladle. They operate quickly, accurately and unfailingly. They improve the quality of your castings, and increase production. Write for descriptive folder. L. H. Marshall Co., 270 W. Lane Ave., Columbus 2, Ohio
MARSHALL
THERMOCOUPLES

Book Review

Text in *Patternmaking*, by Alexander V. Hanel, cloth, 314 pages, 6 x 9¼ in., published by the Bruce Publishing Co., Milwaukee. Price $2.96.

The author, an instructor in patternmaking at Boys' Technical High School, Milwaukee, has prepared this volume as an aid to the student and instructor in wood patternmaking, and also for the apprentice patternmaker. The work is divided into two parts, the first giving general related information as well as pertinent specific technical data. The second part includes jobs designed to give the student training in fundamental skills and procedures in a logically graduated sequence.

The section on general information includes data on molding and pattern allowances, tools used in patternmaking, lumber, supplies, patternmaking machinery, pattern layout, joinery, segmental and staving construction, core prints and core boxes, gear patterns, propeller patterns, and the method of using patterns in the foundry.

The section on job assignments is divided into eight semesters, starting with 9B and going through 12A. The first job in the first semester deals with an angular block and the last job in the eighth semester has to do with a screw propeller. A glossary of patternmaking and molding terms is included.

The text is exceptionally well illustrated with reproductions of photographs and drawings and should provide a valuable addition to the work of teaching high school and trade school students in the art of patternmaking.

Malleable Iron Annealing

(Continued from page 83)

Malleable Iron Co. Detroit—are still in use for annealing heavy castings of low-silicon iron, for the disadvantages named above are relatively unimportant on the long annealing cycle required for this work.

The next type of annealing equipment to be developed was the continuous car-type oven such as the one illustrated in Figs. 1 and 2. Such ovens are particularly suitable for large-volume annealing of castings reasonably uniform in size. These ovens are either direct or indirect-fired; and again the castings have to be packed in iron containers, which are piled on the cars in stacks several boxes high. On entering the oven, each new car pushes ahead all the cars in the oven, moving a car of completed work out the discharge end of the oven.

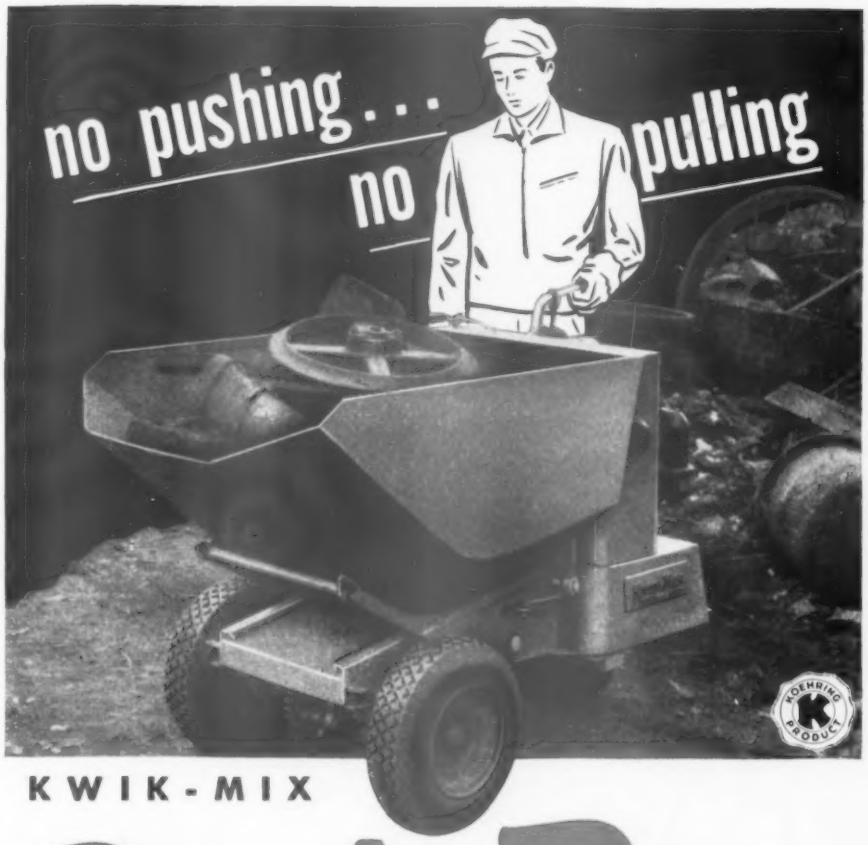
This design brought considerable savings in both time and fuel, since the oven always remains at heat, so that the annealing cycle for an iron containing 1 per cent silicon was reduced to five days.

Features Provide Economy

Outstanding economies in fuel consumption, labor and annealing time were first made possible in the early 1930's by the introduction of (1) light-weight refractories, (2) high-silicon white cast iron and (3) controlled furnace atmospheres. The light-weight insulating fire brick weigh only about one-quarter as much as the fire clay refractories, so take much less time and fuel to bring up to temperature. Protective atmospheres in the furnace chamber prevent scaling and eliminate the necessity of packing the castings in containers; and fast-annealing irons, together with improved mechanical design features, permit further economies as described later.

Use of controlled atmospheres surrounding the work in the furnace meant abandoning direct firing and called for indirect heating methods. It also required the use of gas-tight furnace construction, together with access to the furnace chamber through vestibules which could be purged of air, or by other suitable means.

The first continous malleable annealing furnace incorporating these features is shown in Fig. 3. This



KWIK-MIX

Moto-Bug

has power forward and reverse

● This low-cost power wheelbarrow takes *all* the hard work out of hauling sand, coke, scrap, etc., because it has power both forward *and reverse* from 1½ to 4 m.p.h.

● Easily hauls 10 cu. ft. in big hopper, or carries 1200 lbs. on sturdy 4-ft. flat-bed. Result: bigger loads per trip, less operator fatigue, more loads per day.

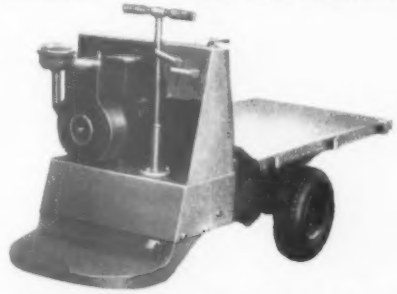
● *Standard-make*, 4 h.p., 4-cycle, gasoline engine takes full load up 20% ramps or grades. Handy 33" width clears narrow aisles and doorways . . . turns in own length.

● Moto-Bug has positive steering, direct to dual rear wheels. Extended steering handle easily converts to "T" for varied operations.

● Riding step, optional, plus positive steer arrangement, and forward and reverse power, let operator ride while traveling, spotting, and backing up.

● Dual steering wheels are standard equipment . . . dual drive wheels optional, for plenty of rubber-tired traction, flotation and handling ease on or off pavement.

● You'll find this job-proved Moto-Bug the lowest-cost answer in foundries, factories, around plant yards, etc. . . . makes man-hours 3 to 4 times more productive.



Send for complete Moto-Bug facts to: KWIK-MIX CO., Port Washington, Wis.

NAME ..... TITLE .....

COMPANY ..... DEPT. OR DIV. .....

STREET .....

CITY ..... STATE .....

KM26

KWIK-MIX COMPANY
PORT WASHINGTON, WIS.
(Koehring Subsidiary)

furnace was built by Holcroft & Co. in 1934 at Michigan Malleable Iron Co., where it has been in continuous operation ever since. Lightweight refractories were used, and the furnace is heated by removable cast electric heating elements. Shortly thereafter, the same company designed and built the similar unit shown in Fig. 4. This was the first continuous furnace to be heated by gas-fired radiant tubes, and is still in service at International Harvester Co.'s McCormick Works, Chicago.

Both of these furnaces use an inert gas atmosphere to protect the work and the castings are loaded on alloy trays which weigh less than half as much as the work to be annealed. Warping is prevented by using a relatively shallow depth of load, and, where necessary, by holding the work in fixtures.

Atmospheres of various analyses are widely used in malleable annealing furnaces today, the analysis being governed by the requirements of the work in process.

Typical Gas Generator—A generator for producing atmosphere gas of the exothermic type is shown in Fig. 5. This unit consists essentially of a control valve to regulate the input mixture of air and gas (propane, natural or city gas); a gas booster; a combustion chamber where the gas-air mixture is burned; and a refrigerated water spray tower in which moisture content of the output gas is reduced to less than 1 per cent. This gas consists of about 5 per cent carbon dioxide, 10 per cent carbon monoxide, 15 per cent hydrogen and the balance nitrogen, and is nonscaling to iron at annealing temperatures. In some instances, gases which are nondecarburizing as well as nonscaling are used.

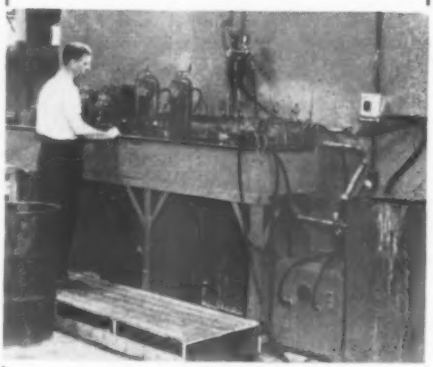
The volume of generator gas required is determined by the tightness of the furnace and the frequency with which air must be purged from the loading and unloading vestibules. In furnaces of a type described later, the required volume of generator gas is greatly reduced and in some cases entirely eliminated, because where frequent purging is not necessary, sufficient gas to prevent oxidation of the work is made from the iron itself through reaction of the carbon in the iron with the sealed-in air in the furnace.

High-silicon Iron Annealing—Several new analyses of malleable iron were introduced around 1934, two of the major ones having silicon contents of 1.60 per cent and 1.30 per cent, respectively. Because of the high rate of graphitization of these irons, it is possible to apply the advantages of controlled-atmosphere annealing furnaces to a broad range of parts, particularly those of small and medium size. For example, 1.60 per cent silicon iron is being successfully annealed in 14 hours, and 1.30 per cent silicon iron is fully annealed in 30 to 31 hours. However, heavy castings such as many parts used for tractors, trucks and tanks require iron containing only about 1 per cent silicon, in order to assure perfect soundness and malleability; and this iron cannot be annealed in anything like 30 hours even when heated on trays.

Taking advantage of light-weight refractories, a nonscaling atmosphere to reduce the weight of container, and a high-silicon iron, furnaces were built to produce 20 to 22 tons per day of annealed malleable iron of 1.60 per cent silicon content, with an overall length of approximately 60 feet for heating and controlled cooling. In annealing castings of 1.30 per cent silicon content the same furnace has a daily capacity of 10 to 11 tons. With a 1 per cent silicon iron, an annealing cycle of 72 hours is usually

FOR EVERY FOUNDRY PURPOSE
Goose Lake
FIRE CLAYS
• The most widely used of all fire clays in midwest foundries. They supply every bond and refractory requirement. These clays are prepared in a large, modern grinding plant, which for 32 years has served the foundry industry with prompt and dependable shipments.
Valuable consultation is available with experienced engineers for the best use of fire clays in foundry bond and refractory service. They often supply important help for the reduction of foundry scrap losses.
A new booklet with many pictures about the production of Goose Lake Fire Clays is available upon request. Write now for your copy.
Make "your" next car of fire clay GOOSE LAKE
Illinois Clay Products Company
FIRE CLAY • CLAY BOND • BRICK • BLOCK
JOLIET, ILLINOIS

Leaking Pressure Castings Salvaged!



WITH THE

MOGUL

CAST SEAL PROCESS

Mogul Cast Seal Process will solve your problem by circulating or by vacuum impregnation. All ferrous or nonferrous castings can be impregnated—no muss or baking—casting sealed will stand any test.

Photo shows M-1000 circulator used for testing and impregnating pump castings.

METALLIZING
COMPANY OF AMERICA
3520 W. CARROLL AVE.
CHICAGO 24, ILL.

required, and in this case the furnace would have a capacity of about 4¼ tons per day. Obviously the advantages of this improved furnace installation are proportionately less as the annealing time is increased; yet the savings in time and money are substantial even on a 72-hour annealing cycle.

Based on the foregoing considerations, it was decided to design a furnace which would (1) use a controlled atmosphere and indirect heating, (2) have automatic temperature control throughout the heating, holding and slow-cooling cycles, and (3) provide the flexibility of operation required for annealing low-silicon as well as high-silicon castings of widely varied size and shape. The resulting furnace is the batch-type unit shown in Figs. 7 and 8.

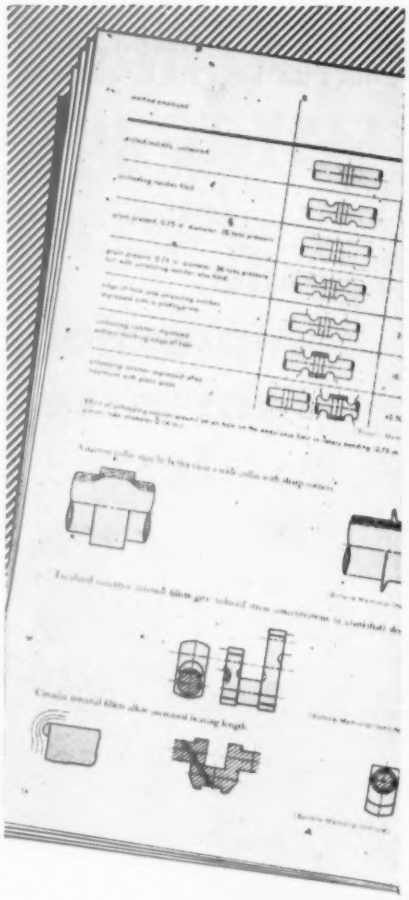
Furnace Sealed Tightly

This unit has an annealing chamber 10 x 20 ft with a loading height of 3½ ft, enclosed in a steel shell welded gas-tight and lined with light-weight insulting fire brick. The door is also insulated, and is sealed gas-tight by clamping it against an asbestos rope held in a steel retainer extending completely around the opening. Heating is by gas-fired radiant tubes extending across the furnace both above and below the work. A protective atmosphere may be introduced and vented through a pipe at the bottom of the furnace chamber. Where no generator gas is used, a nonscaling atmosphere is provided by reaction of the sealed-in air with the carbon in the iron.

Furnaces of this design are in use at the Waukesha, Wis., plant of International Harvester Co. and at Michigan Malleable Iron Co. From 17 to 20 tons of castings make up a charge, and the time required for annealing is determined by the chemistry of the iron.

An interesting feature of this design is the alloy tray which carries the load. This tray is of grid construction and weighs 2 tons—only 10 per cent of the weight of the iron being annealed. Loading and unloading of the furnace is simplified by a power-driven transfer car which moves up to the furnace opening on rails, extracts the tray of annealed work and pushes the new charge into the furnace on three rows of alloy rollers.

A variation of this annealer is the bell-type oven, in which the base is stationary and the furnace proper is in the form of a cover, which is lifted by overhead crane at the end of the annealing cycle and placed



The Design Engineer can improve service life

Ingenious design, based upon the understanding of imposed stresses and their proper control, can increase the life of machinery. A 72 page booklet, free upon request, discusses the relation between design, the choice of steel, and its treatment. Send for it.

Climax Molybdenum Company
500 Fifth Avenue · New York City

Please send your FREE BOOKLET 3 KEYS TO SATISFACTION

Name.....
Position.....
Company.....
Address.....

F-1 F 23

AMAZINGLY EASY TO USE

for

Tensile, Compression, Transverse *Tests*

Model MP-10 UNIVERSAL TESTING MACHINE

A compact, motorized, hydraulically operated machine furnished in capacities up to 100,000 pounds. So constructed that "true axial pull" is imposed on the specimen without any side loads. This is accomplished by placing the hydraulic cylinder at the top of the machine rather than in the base—an exclusive STEEL CITY feature. Comes complete with pulling jaws, compression plates, two easy-to-read maximum indicating gauges and wiring to customer's specifications. Write for descriptive bulletin.

SEND US YOUR TESTING PROBLEM

We can supply or develop the machine you need. Full line of Brinell hardness, ductility, tensile, transverse, compression, and hydrostatic machines. Send us details of problems.

Steel City Testing Machines Inc.

8845 Livernois • Detroit 4, Mich.

over a freshly-charged base.

Automatic Semi-continuous Units—Further refinements in the design of both batch type and continuous annealing furnaces are incorporated in six units recently installed at International Harvester Co.'s McCormick Works.

Three of these are the semicontinuous furnaces shown in Fig. 9. These units include the previously mentioned features that make for economical operation: Light-weight refractory lining is used throughout; the furnaces are gas-tight and heated by radiant tubes so that the work does not have to be covered. In addition, these furnaces are about 8 ft above floor level and are quickly loaded and unloaded by hydraulic pushers and elevators at each end. As the elevators seal the only openings, which are in the floor of the furnace, the volume of protective atmosphere required to prevent entrance of air is reduced to a minimum.

Uses Two Sets of Trays

The castings are carried on grid type alloy trays, 2 ft square and taking a maximum net load of 500 lb each. The trays are handled five abreast on five pairs of rails, both in the furnace and at working level directly beneath the furnace. While one load of work is being annealed, the preceding set of trays is unloaded, loaded with green castings and placed in position on the rails beneath the furnace, ready to go into the furnace.

At the end of an annealing cycle, the charge elevator (Fig. 11) is lowered and hydraulic pushers beneath the discharge end move forward. This advances all the trays beneath the furnace and pushes a group of five trays onto the elevator. The elevator then rises into the furnace, where other pushers move the trays off the elevator and onto the furnace rails. When this is done, all the trays in the furnace are advanced one position, and the foremost tray in each row is pushed onto the discharge elevator. When these trays are in proper position on the elevator, they trip a limit switch, thus reversing the pushers and lowering the two elevators to the rails under the furnace. The trays are then pushed off the discharge elevator, thus advancing all the trays to load the charge elevator as before; and the discharge elevator returns to the up position to receive and discharge the next group of trays.

These operations are repeated in rapid succession, until the furnace is filled with a new charge and the rails under the furnace are filled with trays of annealed work.

When the annealed work has cooled sufficiently, all the trays are reloaded as follows: There is a transfer car at each end of the roller rails, as shown in Fig. 11. The trays are pushed, five at a time, onto the "unload" transfer car; pulled out from beneath the furnace; slid onto a roller conveyor (shown in Fig. 10); unloaded; loaded with green castings; weighed; put onto the "load" transfer car at the opposite end; and returned to the rails beneath the furnace. This is done while the preceding batch of work is in the furnace, so that a full charge of trays is ready to go into the furnace when the anneal is completed.

The furnace charge consists of 60 trays carrying 15 tons net load on the five sets of cast alloy skid rails. Twenty gas-fired radiant tubes supply the heat required. Because of the length of the furnace, these tubes are manifolded in two zones, and the temperature of each zone is controlled automatically. After the work has soaked for the required length of time at 1750° F, air can be forced through these same tubes by a high-volume blower for fast cooling to 1500° F. The tubes are then used for intermittent heating or cooling for automatically controlled slow cooling of 2 to 8 degrees per hour, or whatever rate may be required by the analysis of the iron.

These furnaces can be used for annealing iron of any analysis and for castings of any thickness.

Continuous Automatic Furnaces—The three other new malleable annealing furnaces at International Harvester Co.'s McCormick Works are shown in Fig. 13. These are of the same general construction as the elevated batch-type units just described, but are designed for continuous production.

Fig. 12 gives a sectional view of one of these furnaces, and shows a typical annealing cycle. The castings are loaded onto alloy trays, 2 ft square and carrying 450 lb of iron, and are placed in the furnace by the charge elevator—five trays at a time. Hydraulic pushers move the trays onto five parallel pairs of alloy roller rails, at the same time moving a group of five trays of annealed work onto the discharge elevator, which then brings them down to working level for unloading. The trays are unloaded and returned by roller conveyor to the loading platform near the charge elevator.

The furnace chamber in this case is 12 x 82 ft, and is heated by 32 gas-

fired U-shaped radiant tubes. As the work progresses through the furnace, eight tubes bring it up to heat; 14 tubes in two zones hold it at 1750° F; four air-cooled tubes of the same design fast-cool the work to 1450° F; and ten tubes in three zones provide the required slow cooling. All temperature zones are controlled automatically by means of thermocouples and motorized valves.

These furnaces are of gas-tight construction. Both elevators have seals which prevent infiltration of air when in the up position, and each elevator carries a hood which drops in position to seal the opening when the elevators are down. Because of this design, the volume of generator gas required for each furnace does not exceed 300 cu ft per hour.

The five-row furnace just described has a capacity of 18 tons per day of castings requiring a 60-hour anneal. A second furnace carries three rows of trays and anneals 13 tons per day of castings requiring an annealing cycle of 31½ hours. The third furnace, carrying four rows of trays, is producing 17 tons per day on a 31½-hour annealing cycle.

The elevated batch-type furnaces shown in Figs. 9, 10 and 11 have a fuel consumption of 5,200,000 Btu per net ton of annealed iron on a 72-hour cycle, while the continuous furnaces shown in Figs. 13 and 14 have fuel consumptions of 4,700,000 Btu per net ton on a 60-hour cycle and 3,900,000 Btu per net ton on the 31½-hour cycle. These figures range from 30 to 60 per cent of the estimated fuel consumption of the earlier furnaces described.

Sand Freight Rates Are Attacked

A complaint has been filed before the Interstate Commerce Commission by the National Industrial Sand Association in an attempt to seek relief from what the latter indicates are inequitable freight rates on shipments of naturally bonded molding sand. The complaint points out that all sand other than bonded sand takes a lower rate when shipped in open-top cars than it does when shipped in box cars or in open-top cars fitted with protective covering. However, bonded sand shipped unprotected in open-top cars is charged the rates which apply to unbonded sand shipped in closed cars. For instance, the rate from Millville, N. J., to Boston on unbonded sand shipped in open cars is $4.49 per net ton, and on bonded sand it is $4.98.

SEMET-SOLVAY FOUNDRY COKE

Do you *know*? When the wind is on and you see the first iron trickling past the peep hole, do you *know* your castings are going to have the strength, Brinell and composition you're shooting for? The users of Semet-Solvay Foundry Coke no longer worry about that problem. They are *sure* of results.

SEMET-SOLVAY DIVISION
Allied Chemical & Dye Corporation
CINCINNATI • DETROIT • BUFFALO
In Canada: SEMET-SOLVAY COMPANY, LTD., TORONTO

for Better Melting

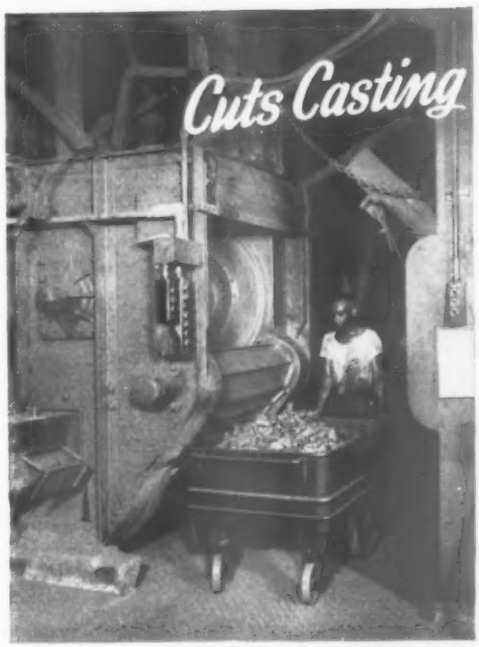


Illustration shows one of 25 Sterling Heavy Duty Trucks in daily use at the Green Foundry, St. Louis, Mo.

Sterling Heavy Duty All-Steel Trucks are ideal for transporting castings from Wheelabrator, Roto Blast or similar equipment. 2000 lbs. capacity. Reduces number of loads required. Saves both time and labor. Height is adjustable to accommodate discharge door. Roller bearing wheels and ball bearing swivel casters increase maneuverability. Sturdy, reinforced welded construction.

Investigate how these heavy duty Sterling Trucks can cut your casting handling costs. Write today.

STERLING WHEELBARROW CO.
Milwaukee 14, Wisconsin, U. S. A.

Sterling
FOUNDRY EQUIPMENT

A 5656-1/3

CLEVELAND
AIR
VIBRATORS

TYPE "SA"

FOR LOW-COST . . .
DEPENDABLE . . .
POWERFUL VIBRATION

● Designed to remove match-plate patterns from sand molds, CLEVELAND Type "SA" vibrators feature low-cost operation, instant starting with full power, minimum working parts, and powerful hammer-like high-frequency vibration.

Type "SA" air vibrators withstand continuous hard use with minimum maintenance. Ground, hard-chrome plated pistons and anvil-type heads are uniformly hardened and resist all tendency to "mushroom".

CLEVELAND Type "SA" vibrators are available in seven sizes for a wide range of foundry applications.

WRITE FOR COMPLETE CATALOG AND PRICE LIST.

Type "SA" with "Z" swivel connector

Type "SA-D"

Alternate attachments available from stock.

Type "SA-B"

Type "SA-E"

CLEVELAND VIBRATOR CO.
2789 CLINTON AVENUE
CLEVELAND 13, OHIO

A FOUNDRYMAN ABROAD

(*Continued from page* 55)

very big cars in France and elsewhere in Europe. Renault has a good foundry with rigging and production comparable to the best in America. Besides a large iron foundry, there is also an electric steel foundry.

Robert Ronceray of the Ph. Bonvillain & E. Ronceray Co. of Choisy-le-Roi was kind enough to drive me for visits to a half dozen interesting French foundries. Mr. Ronceray's company builds very popular foundry equipment, which I saw everywhere in France and Belgium. His father, E. Ronceray, was a noted foundryman and was awarded one of the American Foundrymen's Society gold medals in 1926. Robert Ronceray is very proud of this award and has the AFA certificate framed and hanging in a prominent place in his office.

We spent a day at Pont-A-Mousson near Nancy, visiting one of this large company's plants. They have one of the best centrifugal pipe plants in the world, and also a large fittings foundry. There are four blast furnaces in this plant and pipe is cast from direct blast furnace metal. Production is some 450 tons of pipe per 8-hour, the range of size being from 12 to 30 inch diameter.

Not All Work

Although I had very little time for sight-seeing, I did manage to see some of the interesting sights of Paris, such as the Arch of Triumph where France's unknown soldier is buried, the Eiffel Tower, Napoleon's Tomb, Notre Dame Cathedral, etc. Paris is perhaps the most beautiful city in the world, but dirty old Chicago looked mighty good to me when I got home.

After a week in France, I flew from Paris to London, and my last week in Europe was spent in England. Headquarters were in Birmingham, which is the center of England's manufacturing district. In five days I drove 1200 miles in company with E. Hunter of the Incandescent Heat Co. We visited eight or ten foundries, all of which were interesting, but space will not permit detailed comment except on a few of them.

One thing that impressed me, not only in England but in most European foundries, was the insistence on appearance and finish of castings. Molders in Europe spend much more time than their American brothers in finishing a mold. A casting must look like a piece of jewelry. A good example of the emphasis on appearance was noted at the International Harvester plant at Doncaster. This plant will be beautiful when completed and is already turning out two tractors per day. A large new foundry is in process of construction, and the present small foundry cannot keep up with the rest of the plant. To correct this condition, a large tonnage of castings was ordered from the parent company in America. When they were received, the chief inspector was ready to reject the entire shipment on the basis of finish. Fortunately, the manager came from one of the American company's home plants and knew the castings were perfectly all right, which proved to be the case when they went through the machine shop.

Is Well Mechanized

We visited a stove plant which manufactures domestic electric cooking stoves. The castings are very light and the daily tonnage is small, but all patterns are mounted for machine molding, the molds travel from machine to pouring station on roller conveyors and the shop is well mechanized throughout. The daily production is 8 to 10 tons, and metal is melted in two 18-inch inside diameter cupolettes at a rate of about 1 ton per hour. A home-made charger for these small cupolas was being built in the machine shop.

The Austin Motor Car Co. at Long Bridge has a well equipped, thoroughly mechanized production foundry. Cupolas are run for 16 hours, and have water-cooling glands in the melting zone. Austin also operates a converter steel foundry which makes principally castings for plant maintenance.

English foundries are busy, and there is a shortage of skilled molders. American-built foundry equipment has a splendid reputation in England, and also in Belgium, France and Holland. It was noteworthy that even in small foundries in Europe, foundrymen were interested in mechanizing their molding, charging and all possible operations. We saw foundries which have been operating for many years with old-time hand methods, which are now installing molding machines and good sand-preparing and sand-handling equipment.

In all of the countries visited, I noted that the side-blow converter has never lost popularity, and is considered as a producer of quality steel. The open-hearth furnace, as in America, is used for heavy castings and large tonnages. The electric furnace is used principally for alloy

and other grades of special steels.

In every foundry visited, without exception, I was received cordially and shown everything I wished to see. I found great respect for equipment built in America and for American production methods. I was in England when the pound sterling was devalued 30 per cent, which was a very depressing thing for everybody.

I was sorry I was so rushed during the entire trip, but I saw what I went to see, that is, a lot of foundries. I didn't visit one art gallery because, like many of the old-time foundrymen, I would rather see a beautiful casting than the finest painting ever made.

Reference

1. "Ferrous Melting Furnaces in the United States and Canada," by A. W. Gregg. *American Foundryman*, October, 1949, p. 27.

Book Review

A History of Cast Iron in Architecture, by John Gloag and Derek Bridgewater, cloth, 395 pages, 8¾ x 11¼ in., published by George Allen & Unwin Ltd., London.

Designed to give the architect both the historical background and the modern developments in the application of cast iron in architecture, this book also provides much of interest for the foundryman and student of foundry. Beginning with the early efforts in producing castings, the text follows progress in the following periods: Cast iron becomes established, 1650-1750; the new material in architecture—the rise of cast iron, 1750-1820; industrial expansion of the cast iron industry, 1820-1860; changes in the industry following the development of new uses, 1860-1900; and twentieth century developments, 1900-1945.

The authors have included 507 illustrations covering every type of cast article utilized in the construction field, beginning with ancient Chinese figures, and including castings for hearths and stoves, water wheels, engines, water mains, bridges, industrial buildings, railings, balconies, gates, lamps, stoves, drinking fountains, tunnels, bathroom fixtures, furnaces, and many others.

In the foreword, Sir Charles Reilly points out that cast iron is indeed one of the most ordinary building materials, finding its way in many forms in every building, yet few architects have given much thought to it or to its manufacture. This book reveals that cast iron has not only had a romantic history, playing a part in many famous buildings, but that it has many qualities, finishes and uses which are not well known by that profession.

8¢ per TON IS HANDLING COST REPORTED BY A FOUNDRY USER OF *KRANE KAR*

A Midwestern foundry reports, "***KRANE KAR*** can unload 50 to 55 tons of pig iron and malleable steel in 3 hours." Steps up unloading from gondola cars into storage piles and bins, and loading of scale cars and charging buckets. Magnet also handles skullcrackers. ***KRANE KAR*** may be operated by any man. Ask our nearest agent how to prune your materials-handling cost for modern, economical foundry operation. Ask for our New Bulletin No. 69.

USERS: Fargo, Howard, Coeur d'Alene, United Eng. & Foundry, Bethlehem Steel, Birdsboro Steel, Ohio Steel, Hartford Electric Steel, Harrisburgh Steel, U. S. Steel, Detroit Gray Iron, etc.

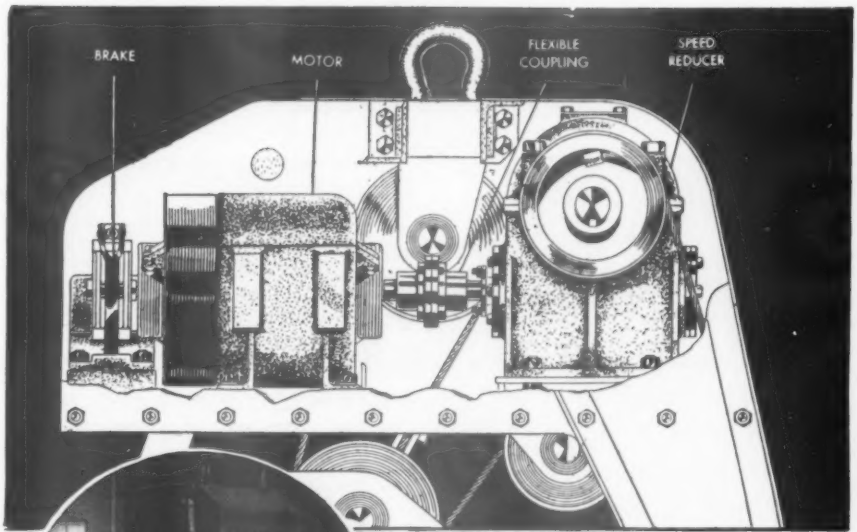
THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

1½, 2½, 5, AND 10 TON CAPACITIES

KRANE KAR

TRADE MARK REGISTERED

SILENT HOIST & CRANE CO., 885 63rd ST., BKLYN 20, N.Y. U.S.A.



HOOK 'ER ON—PLUG 'ER IN

ABOVE YOU SEE WHY the Erie Electric Bucket works in its own headroom controlled from the crane cab. This sturdily constructed bucket needs only to be hooked over the crane hook and power line plugged in. The man in the cab controls the opening of the bucket from cracking the lips to any degree of opening or closing. The extra in-built weight permits easy penetration. *Write for complete particulars.*

ERIE STEEL CONSTRUCTION CO
1011 GEIST ROAD • ERIE PA

ERIE BUCKETS
THE MOST COMPLETE LINE BUILT

ALSO AGGREMETERS
ELECTRIC OVERHEAD CRANES
PORTABLE CONCRETE PLANTS

■ In 1944, Republic Brass Co., Cleveland, Ohio, installed 236′ of 24″ x 5-ply INSULATED SAHARA on a shakeout conveyor. Five years of continuous service, 40 hours a week, handling red hot sprues and sand above 300° has left this Imperial belt "in excellent condition."

Unusual? Not for SAHARA beltings. Like all successful foundry equipment, they are specifically designed and constructed for the destructive high-temperature conditions of foundry service.

Job-Designed Belting

Made from tight-woven, 37½-ounce silver duck, SAHARA belts are protected against the destructive effect of high-heat service by long-fiber asbestos insulation and special impregnating compounds. Double-stitched, Inner-Locked construction positively prevents ply separation.

STANDARD SAHARA is built to handle materials to 300°; INSULATED SAHARA from 300° to 450°; SUPER-INSULATED SAHARA from 450° to 600°, F.

Write for Data Sheet 47-8 and prices.

Imperial Inner-Locked BELTING

Engineered Belting—The Right Belt for Each Job

IMPERIAL BELTING CO. 1755 S. Kilbourn Ave., Chicago 23, Ill.

SMOOTH SKIN

ON DRY AND GREEN SAND CASTINGS MAY BE OBTAINED THROUGH THE USE OF

ASBURY FOUNDRY FACINGS

CORE WASHES
INGOT MOLD WASH
KLEAN-A-KAST
A special purpose shake on facing
PIPE REDUCER
CARBON RAISING GRAPHITE

Expanded facilities, careful laboratory control, plus 53 years experience . . . adds up to improved products.

THE *Asbury*

GRAPHITE MILLS, INC.

ASBURY, N. J.

Factors affecting DEVELOPMENT of DUCTILE IRON

(*Continued from page 62*)

thousands of tons of engineering, acicular, martensitic and austenitic cast irons being produced annually in this industry. In these fields cast iron has not only held its competitive position with other engineering materials but is continuously replacing other engineering materials.

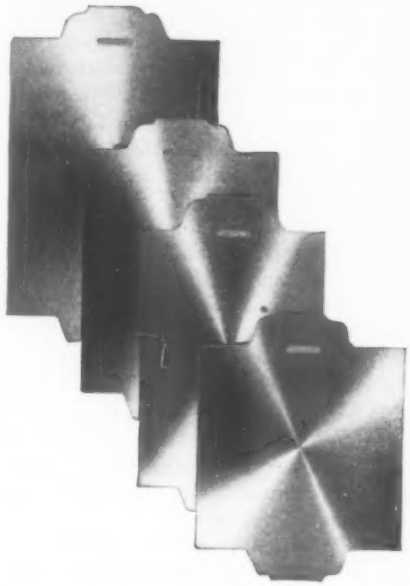
In a talk given to an AFS chapter at Grove City, Pa., a few years ago I suggested that we analyze the progress of the gray iron foundry industry for 100 years. A century ago our most important engineering materials were lumber, brick, stone and cast iron. Cast iron was a very important material. In the intervening years many new and glamorous engineering materials have been introduced: Steel, aluminum, magnesium, synthetic rubber, plywood, plastics and safety glass. The industrial pie of American engineering materials has increased many fold in these 100 years. The cast iron slice of this industrial pie has been decreasing percentagewise although the tonnage of the cast iron industry has increased.

Will Increase Business

The ductile iron development will increase the size of America's industrial pie, for the utilization of a new material will make new things possible and it can greatly increase the gray iron industry's slice of that pie. Last year the ferrous metal industries of this country produced about 81.5 million product tons—about 66 millions in the steel industry and 15.5 millions in the foundry industries. The foundry industry can move now to improve its important position in the ferrous metals industry.

When I say that as much as 100 tons of ductile iron have been made in one foundry in a single day, or that numbers of castings each requiring 25 tons of metal to pour have been made of ductile iron, or that thousands of different component parts, and as many as 12,000 of one part have been made of ductile iron, or that many licensed producers have had repeat orders for ductile iron component parts, I do not wish to infer that this new material is being produced in large commercial tonnages. Probably as much as 350 tons has been made in a single day in this country so far.

I certainly do wish to leave the impression that there is commercial production now but the consumer of engineering materials is busy



Cast Aluminum
MACHINED PATTERN PLATES

Shipped promptly from the World's Largest Stock

All standard flask sizes are carried in stock. All plates are cast with one inch flask margin all around PLUS large, well shaped ears for flask pins and vibrator. Order by flask size, not plate size. It will pay you to investigate this source for quality plates.

PRICES UNCHANGED SINCE 1944

Below are some typical prices

For 3/8" Plates, Add 33 1/3% For 1/2"

10 x 16	$8.25	12 x 18	$9.90
10 x 18	8.80	13 x 16	9.65
11 x 16	8.55	14 x 14	9.35
11 x 18	9.35	14 x 16	10.15
12 x 14	8.55	14 x 18	12.10
12 x 16	9.05	16 x 16	12.10

SEND FOR PRICE LIST TODAY

Special Shapes and Thicknesses to Order

ARTHUR E. WILL
643 West 11th Street
ERIE, PA.

proof-testing ductile iron, and heavy tonnage production awaits his findings. I think commercial production in 1950 will amount to significant figures because the economic and laboratory stages of the development are rapidly being translated into commercially available new materials. However, I do not mean to infer that, though this young giant is moving forward with seven league boots, we have all the answers.

For example, we are conducting many types of corrosion tests on ductile iron, but that is a complex study and many corrosive media have to be investigated before our knowledge of this subject will be adequate. As remarked previously there are many members of the ductile iron family and it is probable some will show excellent corrosion resistance and others less resistance. Generally the ductile irons should compare favorably with many other engineering materials considered for a corrosive application.

The ranges in brinell hardness from the softest members of the ductile iron family to the hardest member is from about 150 to more than 650.

The damping capacity of ductile iron is inferior to that of ordinary gray iron but it is much closer to gray iron than to steel.

Supervisor's Guide Is Published

American Management Association, 330 West 42nd St., New York 18, has published a 190-page "Supervisor's Management Guide" prepared by 17 operating executives and specialists to assist supervisors, foremen and other operating executives in industry to apply new developments in management methods for improving human relations in business.

The 20 chapters cover the basic principles of sound human relations, supervisory attitudes and practices and their effects on worker morale and productivity, the executive responsibility for developing morale, dealing with emotional problems on the job, the art of speaking effectively to employees, tests for determining competent supervisors and executives, and related subjects.

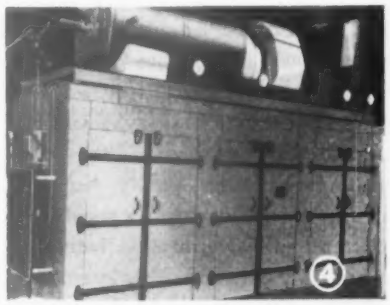
Copies are available to AMA members for $3; nonmembers, $3.50.

Victor Equipment Co., 844 Folsom St., San Francisco 7, has purchased the business and assets of Mills Alloys Inc., 11320 Alemeda St., Lynwood, Calif. Operations will be continued at Mills Alloys Inc.

LANLY OVENS *insure* GREATER PRODUCTION AND LOWER COSTS

FIG. 3—A Rack Type Oven which accommodates two racks side by side with a single set of doors. Installed where space limitations do not permit separate openings for each rack.

FIG. 4 — Three Compartment Rack Type Oven is equipped with combination oil gas burner equipment. The change from oil to gas or vice versa can be made in a few minutes.

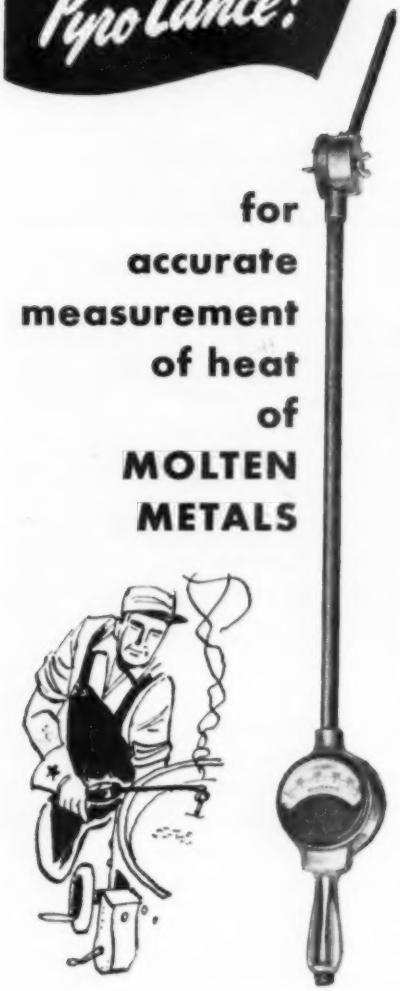


Write for Bulletins on LANLY Finishing, Cabinet Type and Heat Treating Ovens.

THE LANLY CO.
OVENS FOR INDUSTRY
780 PROSPECT AVENUE
CLEVELAND 15, OHIO

Pyro Lance!

for accurate measurement of heat of MOLTEN METALS



For quick, accurate temperature readings of molten metals, operators of non-ferrous foundries everywhere are relying on the Alnor Pyro Lance. Portable, handy to use, the Pyro Lance has a protected thermocouple, with adjustable angle head, mounted in the lance tip. It takes temperature below the surface—unaffected by dross or other conditions. Here's an easily handled instrument to help control quality in the foundry. For complete information and prices on this valuable instrument write for Bulletin No. 1724-D. Illinois Testing Laboratories, Inc., Room 511, 420 N. LaSalle St., Chicago 10, Illinois.

Alnor

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

IDEAS PAY OFF IN CASH

(*Continued from page* 65)

executive secretary of the suggestion system, explains that the booklets are mailed to employees' homes where they are more likely to be read by the whole family, creating more interest in opportunities offered by the company, and helping to build the morale of the family as well as that of the employee. A good suggestion system, according to Mr. Thobaben, must be a morale builder, otherwise it is doomed to failure. It must be fair to the employee and have the sincere backing of the company.

At Cleveland Graphite Bronze Co. a plan for handling employee suggestions was inaugurated in 1936. That original system had two principal faults: The system was anonymous; all suggestions were numbered instead of bearing the name of the suggester. Secondly, no statute of limitations was applied.

In 1943 the system was revised to be basically the same as that now in effect. Suggestions are signed by the suggester, and if they are not adopted at the time of investigation, the suggester is protected for one year from date of rejection notice. A suggestion is paid for if it is used during that period; if not used it may be resubmitted at the end of one year.

The largest award in the history of the company's suggestion system, in the amount of $12,104.03, was made to Dan Reba who suggested a more efficient method of removing graphite cores from copper-lead heavywall bearings. A more recent large award winner, Charles Zamiska, whose picture appears with this article, developed an improved method of handling graphite cores employed in casting bearings. He already has received $4995.18, which is 50 per cent of his estimated award.

What is the Suggestion System?—As described in the manual, the suggestion system is a plan whereby employees are given an opportunity to suggest better ways of doing things. It is a plan that will give employees both recognition and added compensation for ideas that are adopted. The manual states the company's desire for ideas and its recognition that improvements which can be made in all phases of operation, are not the sole responsibility of a few, but of all the employees.

To help put prospective suggesters at ease, the company states that discovering or developing a new or better way of doing a thing will not reflect on an employee's supervisor or anyone else. A practical and useful idea distinguishes an employee and reflects favorably on his supervisors as a good leader who trains his people to think for themselves.

It is the company's intent to reward those submitting original and constructive ideas which result in improvements or saving. It is not intended that the suggestion system accomplish that which the suggester could and should have done on his own initiative, nor is it to be used to correct errors occasionally made when established procedures are not followed.

What Is a Suggestion?—It is a specific idea that will be of benefit to the company in some way. Good suggestions may help to reduce costs, save materials, save work, save time, improve quality, increase production, improve machine performance, make work safer or more pleasant, find new uses for present products, improve service to customers, or attract new customers.

How Is a Suggestion Made?—It is recommended that the employee think his suggestion through clearly and submit it on a standard suggestion blank, answering all questions on the blank, and including sketches if necessary. He should explain clearly what the suggestion will do, stating a specific means of accomplishing the result. General statements and opinions ("someone should find a better way to make this part," or "certain hazards exist, and something should be done about them") are not acceptable as suggestions. A specific solution must be indicated.

The employee is requested to list all company-manufactured parts which he believes will be affected by his suggestion. If the suggestion pertains to manufacturing processes or to routing, all changes in the procedures should be listed. In other words, all of the advantages which are thought to be attainable through application of the suggestion should be stated clearly. The help of personnel in the suggestion office is offered to any employee who may have a question or any difficulty in presenting his suggestion.

How Are Awards Determined?—Two types of awards are made. The class "A" award, where the saving can be computed, equals 25 per cent of the first year's net saving as a result of putting a suggestion into operation. Net saving is total saving minus the cost of development, labor, material, depreciation, experimentation and other expenses of installing the suggestion. If the estimated award is $100 or more, 50 per cent of such award (based on the estimated saving) is paid as

soon as reasonably convenient after installation of the suggestion. The balance of the award (based on the actual saving) is computed and paid at the end of one year from date of installation.

If the estimated award is less than $100, the entire estimated amount is paid as soon as reasonably convenient after installation of the suggestion. If the actual saving at the end of one year is less than expected, no adjustment will be made; if the saving is greater, an additional award will be made.

Class "B" awards, where the saving cannot be definitely computed, such as in the case of safety suggestions, are made in amounts from $5 to $50.

Although it is to the advantage of both the suggester and the company that an adopted suggestion have the broadest possible application, the company does not assume any responsibility for the completeness of such application, nor for the time it takes to accomplish it. In the case where a suggestion applying to a product could apply to more than one part, it is the suggester's responsibility to indicate the numbers of all such parts, because there is no way, without a complete search of the files, to determine all parts to which the suggestion might be applied. It is, however, the practice to check carefully and apply the suggestion, where practicable, to as many parts as are known to be affected.

Additional Saving Is Credited

If a suggestion as submitted would apply to three parts and investigation discloses the fact that it may be applied to three additional parts, and this additional application is made by the company within the suggester's year, any additional saving would be credited to the suggester. Additional credit is computed for that period between the date of actual application to the three additional parts and the end of the suggester's year and not for an additional year from the date the suggestion was applied to those three additional parts.

In event that a suggestion applying to equipment involves a change in three machines of the same type, the company may be unable to, or may choose not to make all the applications at the same time.

If the suggestion were applied on machine No. 1 on January 1, that date would be the beginning of the suggester's year and he would receive credit for 12 months' savings. If machine No. 2 were changed as of April 1, nine months' savings would accrue, and if machine No. 3 were not changed over until after the end

THIS MAKES SENSE

AND SAVES DOLLARS

Always Use

Buffalo Brand

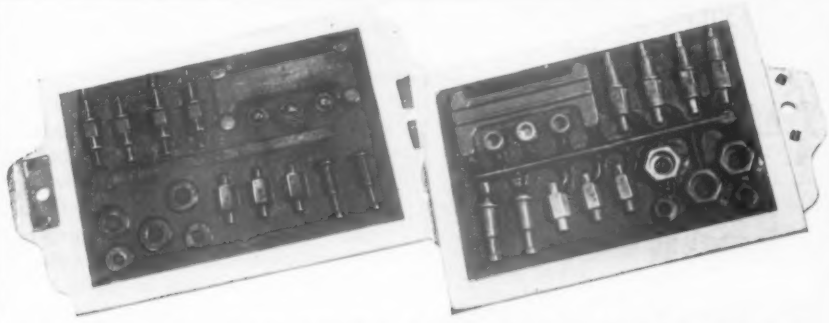
VENT WAX

FOR SAFE, SURE CORE VENTING

Don't chance costly casting losses due to core blowing. Always use dependable, low cost Buffalo Brand Vent Wax and you're sure of speedy, safe core venting when pouring the most intricate castings. Two shapes. 18 sizes. Send for sample today.

UNITED COMPOUND CO.

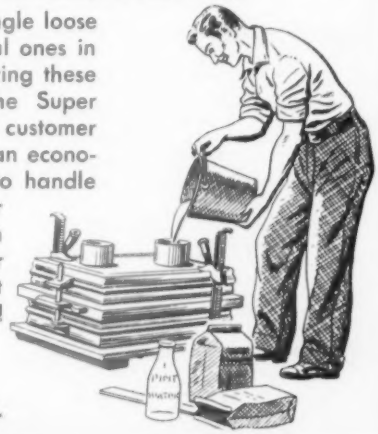
328 SOUTH PARK AVE., BUFFALO, N. Y.



CASH IN ON "LOOSE" WORK IN 1950

Here's how you can make loose patterns pay Big Profits in 1950 . . . the SUPER TAMASTONE way!

The plates shown here are made from single loose patterns. The foundry made white metal ones in multiples to balance the run. By converting these loose pattern odds and ends into the Super Tamastone match plate shown above, the customer received fast delivery on his castings at an economical price, and the foundry was able to handle the job at a healthy profit. Super Tamastone also speeds production on large cope and drag molding. Your men can make this pattern equipment right in your own foundry. Write today!



TAMMS INDUSTRIES, INC.

(formerly Tamms Silica Co.)

228 N. La Salle St., Chicago 1, Ill.

1858 ★ ★ ★ 1950

92

YEARS

of Competent Lumber Service to Industry

but-

specializing in lumber for the pattern shop and the foundry

★

COMPLETE STOCKS OF

GENUINE NORTHERN WHITE PINE

CALIFORNIA SUGAR PINE

NORWAY PINE

HONDURAS MAHOGANY

Kiln Dried Super Thickness Rough or Dressed

Address all inquiries to Dept. "F"—or Wire or Phone your requirements at our expense.

We extend the NEW YEARS WISHES to all our good friends in the FOUNDRY industry

RIETZ LUMBER CO.

1802-14 N. Central Park Ave.
Chicago 47

of the suggester's year, no savings would be credited to the suggester for that machine.

How Are Suggestions Handled?—Suggestions are collected from the boxes each afternoon and delivered to the suggestion office where they are dated. Each suggestion then is written up on the office's own forms, the original suggestion being kept in the office. A copy of the suggestion is sent to the particular investigator best qualified to study it. If he feels, after study, that it needs further investigation he passes it on. Each suggestion may be studied by several investigators. More involved information is obtained from various departments of the company, whenever necessary. All of the resources of the company are available for assistance in this procedure.

The final investigator, after review of the pertinent facts, supplies the following information: Will the suggestion be adopted? What action will be taken to put it in force? Approximately when will it be installed? Is the suggester eligible for an award? If not, why? What is the suggester's job title? Under which award classification (A or B) does the suggestion fall? If class "A", what part numbers should be time studied? Can the saving be computed? If not, what award is recommended? Who else should be consulted? Does the suggestion have patent possibilities? If the suggestion is not to be adopted, explain why?

Recommended awards of $5 or $10 are judged for appropriateness by the executive secretary of the suggestion system. If he approves the original recommended award, it is paid. If he advises a change, or if the recommended award is over $10, an additional review is made by the chairman of the suggestion committee. All suggestions not recommended for adoption are reviewed by the suggestion committee. The committee may, and frequently does, recommend that further study be given such suggestions.

Who Is Eligible for Awards? — Everyone on the hourly or regular salaried payroll is eligible to win awards for making good suggestions. Some workers—research and technical men, for example—are employed to look for better ways to do certain things. When such a person finds a better way—when he finds what he is already being paid to find—he is not eligible for an award under the suggestion system. Such employees, however, are eligible for awards for other types of suggestions such as those regarding improved safety or working conditions. Roughly, the rule is: Employees may not win awards for doing their regular jobs.

Rules on Eligibility

The suggestion committee investigates and decides all questions of eligibility. Its ruling is final and binding upon the suggester. When an individual is discovered to be ineligible to receive a cash award for a suggestion that is adopted, he is notified of his ineligibility and the fact that his suggestion has been adopted. A copy of such notification is sent to personnel records, to be included in the suggester's personal file. The company, under those circumstances, is free to make full use of that suggestion.

Policies of the suggestion system are formulated by a suggestion policy committee composed of James L. Myers, company president, chairman; John W. Dixon, vice president in charge of finance; William G. Laffer, vice president in charge of manufacturing; H. W. Luetkemeyer, chief engineer; Merrill A. Young, personnel director; and any others whom the chairman may appoint.

The suggestion committee, composed of Lawrence Myers, assistant general superintendent, chairman; R. B. Proudfoot, assistant general superintendent; A. C. Schroeder, general foreman, heavywall department; F. L. Heltman, assistant to the personnel director; and G. H. Thobaben, executive secretary of the suggestion system, is responsible for administration of suggestion system policies, review of all suggestions not recommended for adoption prior to notice to suggesters, and review of all suggestions upon which a decision has

TABLE I

Year	Number of Suggestions Received	Number Accepted	Total Awards Paid	Per Cent Accepted	Average Award	Total Employees End of Year
1948	779	255	$ 8,722.10	32.73%	$ 34.20	3338
1947	810	213	10,079.88	26.29%	42.64	3331
1946	812	114	14,506.39	14.03%	127.33	4251
1945	1575	463	19,174.30	29.39%	41.41	4427
*1944	4417	772	19,941.28	17.47%	25.83	6894
Totals	8393	1817	$72,423.95	21.64%	$ 34.17	

* Includes October, November and December of 1943.

MOST
for your money

with
ARROW TOOLS

Costs are reduced by economies in the plant, and chipping is no exception.

Arrow has been serving the foundries with good tools for 35 years, and now with our increased production, we are able to give you better tools at lower prices.

The finest alloy tool steel obtainable is used in Arrow tools. There is no stinting on quality.

Arrow tools are ready and waiting to serve you now. Write for your copy of Bulletin FM.

Blanks are available for those who prefer to make their own.

ARROW TOOLS inc.
1902 S. KOSTNER AVE., CHICAGO 23

been rendered and an appeal for reconsideration requested.

Table I shows results achieved by Cleveland Graphite Bronze Co.'s suggestion system since its reorganization on Oct. 15, 1943. The larger percentage of suggestions received per total employment during 1944 and 1945 is said to be attributable to wartime conditions of rush production and to the revised suggestion system and the attendant greater publicity on the part of the company to encourage employee suggestions. A gradual return to more settled company planning and production activities coupled with the natural tendency of people to relax after a special effort, and the wearing off of the newness of the revised suggestion system is believed to account for the smaller number of suggestions received from employees since the war.

On the other hand, the increasing number of suggestions being accepted indicates that employees are taking more time to think through their suggestions and are being forced by a higher level of general operating efficiency in the plant to work harder in developing a really worthwhile idea. The greater amount of money paid in total awards during any given year is traceable to the fact that one or a few above-average class "A" ideas were submitted, resulting in a large saving and consequently provided greater individual awards.

The percentage of suggestions accepted and the average award compare favorably with the national average of 25.9 per cent accepted and an average award of $19.38 as published by the National Association of Suggestion Systems, 122 South Michigan Ave., Chicago 3, in its annual report dated May 5. Cleveland Graphite Bronze Co., along with approximately 20 other companies, is a member of the Cleveland group of the national association.

Book Review

Structural Design in Metals, by Clifford D. Williams and Ernest C. Harris, cloth, 596 pages, 6 x 9¼ in., published by the Ronald Press Co., New York. Price $6.50.

This volume has been prepared to provide material for a co-ordinated course of instruction for students in the junior year of the average engineering college. Because the authors believe that details, if properly designed, should be as applicable to one type of structure as another, emphasis is placed on design of details. The text deals almost entirely with rolled structural members fabricated by welding or riveting.

SCIENTIFIC
Pressure Cast
MATCH PLATES

Cope and Drag
PLATES

SIZE . . .
Up to 61" x 79"

WEIGHT . .
Up to 800 lbs. per casting

- **Multiple pattern Cope and Drag plates can be made from a single master pattern.**
- **Our system of "backing-out" assures uniform metal thickness.**
- **Our transfer points cast on the plates aid in pinning to the flasks.**
- **See our layout sheets for data required to build backing frames and position ribs and bolting bosses.**
- **Write us for quotations on your next Cope and Drag Castings.**

The
SCIENTIFIC
CAST PRODUCTS
Corp.
1390 EAST 40th STREET
CLEVELAND 3, OHIO
2520 WEST LAKE STREET
CHICAGO 12, ILLINOIS

...TRADE PUBLICATIONS...

For More Details on these Items Use Reply Card—Page 193

SNAGGING WHEEL: Mid-West Abrasive Co., Owosso, Mich. — Folder describes the company's new fiber-center snagging wheel, which is designed to absorb much of the shock and vibration resulting from this type of grinding. The fiber is built into the wheel and is said to make a round, shock-absorbing, nonabrasive, permanent arbor hole liner.
For More Details Circle No. 90—Page 193

SPECTROGRAPHS: Baird Associates Inc., 33 University Rd., Cambridge 38, Mass.—Bulletin XXXII deals with grating spectrographs in 1-meter and 3-meter styles. Diagrams illustrate the type of mounting used in the units, and internal and external construction features are illustrated. Charts show the relative sensitivity of spectrochemical tests for the elements.
For More Details Circle No. 91—Page 193

WIRE SCREEN CLOTH: Robins Conveyors Division, Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J. —Bulletin 113-A, devoted to woven wire screen cloth, contains tables enabling the reader to determine the sizes of openings available for a given diameter of wire. Recommendations are given for the best wire diameter to select for a specific type of service.
For More Details Circle No. 92—Page 193

HOUSE JOURNAL: Precision Scientific Co., 3737 West Cortland St., Chicago 47—A publication entitled "Precisionomics" will be published bimonthly and will contain descriptions of the company's scientific research and production control apparatus as well as articles on items of interest in specialized fields including metallurgy.
For More Details Circle No. 93—Page 193

RADIATION PYROMETER: Bristol Co., Waterbury 20, Conn.—Bulletin P-1242 explains the theory of radiation pyrometry and the features of the radiation unit. Included are photographs and diagrams illustrating accessories offered to adapt the unit for use with furnaces and kilns for indicating, recording and controlling temperatures up to 4000° F.
For More Details Circle No. 94—Page 193

CENTRIFUGAL PUMPS: Allis-Chalmers Mfg. Co., 1032 South 70th St., Milwaukee — Bulletin 08X6256A on the care of centrifugal pumps gives the how and why of pump construction and their effect on pump maintenance. It tells how to figure head, carries tables to help determine total friction loss, and outlines a maintenance timetable.
For More Details Circle No. 95—Page 193

PIPE CONVEYORS: Hapman Conveyors Inc., 2405 West McNichols Rd., Detroit 21—Catalog 5000, covering pipe conveyors and accessories for movement of sand and similar materials, illustrates and describes typical conveyors, drives, vibrators, sludge tanks, trenches, and other equipment. Capacity charts are included.
For More Details Circle No. 96—Page 193

PERMANENT MOLDING: Buffalo Pipe & Foundry Corp., Box 55, Station B, Buffalo—Brochure on aluminum-bronze permanent molding describes advantages of permanent molding and its field of application. Company activities in the manufacture of aluminum-bronze permanent mold castings are described.
For More Details Circle No. 97—Page 193

MEEHANITE: Meehanite Metal Corp., Pershing Square Building, New Rochelle, N. Y.—Bulletin 32 contains a tabular summary of engineering properties of various types of Meehanite castings available. It also contains information concerning property changes as affected by variations in section sizes.
For More Details Circle No. 98—Page 193

WASH FOUNTAIN: Bradley Washfountain Co., 2203 West Michigan St., Milwaukee 1—Folder K711 illustrates installations of the company's Duo-Washfountain and roughing-in dimensions and diagrams indicate the size of the fountain, which is especially adapted to the small washroom.
For More Details Circle No. 99—Page 193

CONVEYOR: George Haiss Mfg. Co., Division of Pettibone Mulliken Corp., 14100 Park Ave., New York 51 —Illustrated bulletin H-487 describes a sectional conveyor that can be used with flat belt or trough belt on any type of portable or stationary mounting—elevating or horizontal.
For More Details Circle No. 100—Page 193

SAFETY: E. D. Bullard Co., 275 Eighth St., San Francisco 3—Catalog of personal protective equipment and industrial safety devices is divided into five sections: First aid; respiratory protection; eye protection; hats, belts and clothing; and miscellaneous safety equipment.
For More Details Circle No. 101—Page 193

FOUNDRY SERVICE: Foundry Services Ltd., Long Acre, Nechells, Birmingham 7, England—Booklet describes services offered by the company, pictures its production facilities, and discusses its products for the treatment of metals, molds and dies.
For More Details Circle No. 102—Page 193

PRESSURE REGULATORS: Air Reduction Sales Co., 60 East 42nd St., New York 17—Catalog covers regulators for welding, cutting, special flame processes, administering anesthetic gases, maintaining gaseous pressures in electrical equipment and other operations where controlled gas pressure is required. A section describes regulator adapters and pressure gages. Flow and pressure charts are included.
For More Details Circle No. 103—Page 193

TRUCKS: Lewis-Shepard Products Inc., 267 Walnut St., Watertown, Mass.—Bulletin 24 describes electric trucks for horizontal movement and for horizontal and vertical movement of material on skids and single or double faced pallets.
For More Details Circle No. 104—Page 193

MOTORS: U. S. Electrical Motors Inc., 200 East Slauson Ave., Los Angeles 54—Bulletin 1524, covering the company's enclosed motors, describes features of the motors and discusses temperature rise in motors and its effect upon windings.
For More Details Circle No. 105—Page 193

OVENS: Michigan Oven Co., 4544 Grand River Ave., Detroit 8—Bulletin covers standard type ovens having suitable application for various industrial drying, baking and heat treating processes for all operating temperatures to 1100° F.
For More Details Circle No. 106—Page 193

ELECTRICAL EQUIPMENT: Russell & Stoll Co., 125 Barclay St., New York 7—Bulletin EL-49-224 features automatic locking plugs, receptacles, and cord connectors. Illustrations and dimensional drawings of the equipment are included.
For More Details Circle No. 107—Page 193

GRINDING EQUIPMENT: Hammond Machinery Builders Inc., 1637 Douglas Ave., Kalamazoo, Mich.—Catalog 60 describes and illustrates the company's line of polishing, buffing, grinding, and deburring equipment.
For More Details Circle No. 108—Page 193

CRANE SCALE: Hydroway Scales Inc., 7632 Fenkell Ave., Detroit 21—Information sheet describes a scale for cranes and chain hoists which has no springs or levers but operates on the static pressure principle.
For More Details Circle No. 109—Page 193

BELTING: United States Rubber Co., Rockefeller Center, New York 20—Catalog gives detailed design, engineering and performance data for the company's line of transmission belting.
For More Details Circle No. 110—Page 193

REFRACTORIES: Walsh Refractories Corp., Dept. M, 101 Ferry St., St. Louis 7—Bulletin lists properties, typical applications and information on fire brick and refractory materials.
For More Details Circle No. 111—Page 193

MOTORS: General Electric Co., Apparatus Dept., Schenectady, N. Y. —Bulletin GEA-4469A describes unit-cooled direct-current motors for dusty, dirty, or oil-laden atmospheres.
For More Details Circle No. 112—Page 193

BUCKEYE HIGH TEMPERATURE CEMENTS OFFER YOU MORE COST-REDUCING ADVANTAGES

BUCKEYE HIGH TEMPERATURE FURNACE CEMENT

Silicon Carbide Base Cement.
For use in any crucible or non-crucible (open flame) type furnace.
Coarse grain Cement for ramming in furnace and monolithic walls.
General all around cement that works well on cupola spouts, ladles, retorts, etc.
Recommended as wash on fire brick or lining.

No. 91 HIGH TEMPERATURE FURNACE CEMENTS

Neutral Cement—Does not react with molten alloys either ferrous or non-ferrous.
Especially adaptable when laying in fire brick where extremely fine and close joints are required.
Wash over furnace walls, tuyere openings and furnace bottoms.
For emergency repairs on hot or cold surfaces or brick work, has coefficient of expansion as that of fire brick.

SHIPPED DRY in 500 lb. Barrels YOU SAVE!

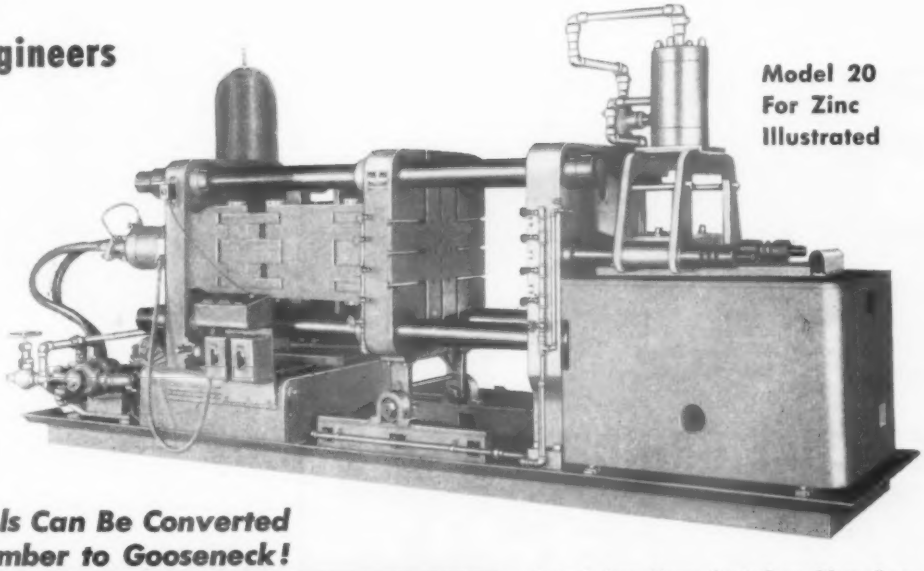
1 Guaranteed to withstand temperature of 3200°—not affected by waste gases or fuels.
2 A convenient dry compound—add water at the foundry . . . save!
3 High mechanical and compressive strength—withstands extremes of expansion and contraction.
4 Possesses remarkable radiation ability — more heat returned from furnace walls.
5 Reduces heat loss through lining.
6 Extends the life of brick and rammed linings.

THE BUCKEYE PRODUCTS COMPANY
7029 VINE STREET CINCINNATI 16, OHIO
Manufacturers of Core Oil • Parting • Core Compounds • Core Wash • Refractory Cements

. . . Designed for Punishment
CAST-MASTER *Die Casting Machines*

Precision Built by Die Casting Engineers

● Cast-Master Die Casting Machines are designed and built by engineers with years of experience in the Die Casting Industry. Each model has been given months of actual operation under the most severe conditions. You'll find a CAST-MASTER geared for years of trouble-free operation plus high speed production at a minimum cost.

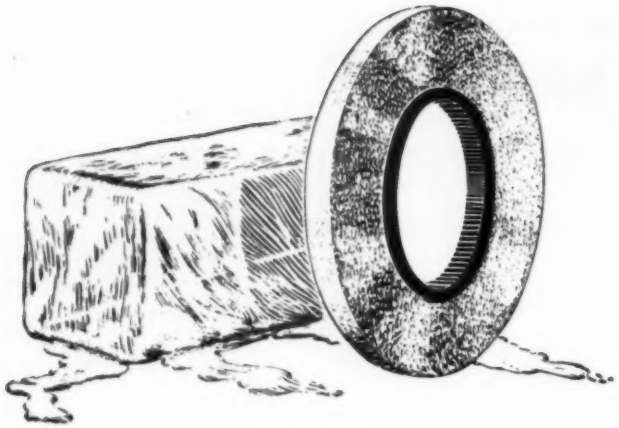


Model 20 For Zinc Illustrated

All Cast-Master Models Can Be Converted From Cold Chamber to Gooseneck!

MILLER•TAYLOR TOOL CO.
5005 EUCLID AVENUE • CLEVELAND 3, OHIO

Send for New Catalog Showing Complete Line of Cast-Master Die-Casting Machines.



IT'S THE COST OF ICE
(AND GRINDING WHEELS)
THAT HURTS

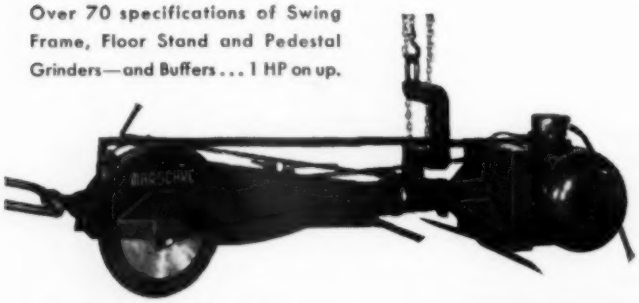
An electric refrigerator is priced higher than an ice box, but—you don't have to buy a new chunk of ice for it every couple of days. Size for size, Marschke Grinders may be priced higher than many other grinders on the market, but you don't buy as many wheels for them—actual tests prove they will save as high as 40% on wheel costs in many grinding operations.

Think a moment and you'll agree—those wheel bills are your real measure of daily grinding costs!

Well balanced . . . with bearing seats *precision ground and honed* to assure perfect spindle alignment and bearing fit . . . built to absorb the *vibration* which literally "melts away" grinding wheels . . . Marschke Swing Frame Grinders are cheaper in the long run, regardless of first cost.

Grinding wheels don't sell for peanuts; you know, too, that the trick is to remove more metal with less wheel wear. These facts have a bearing on your operating costs! An inquiry will bring you interesting data.

Over 70 specifications of Swing Frame, Floor Stand and Pedestal Grinders—and Buffers . . . 1 HP on up.



Shown: Marschke 24" Swing Frame Grinder.

MARSCHKE GRINDERS

VONNEGUT
MOULDER CORPORATION

1839 MADISON AVENUE • INDIANAPOLIS 25, INDIANA

Master Power
HARD CHROMED • PORTABLE PNEUMATIC TOOLS

DO MORE WORK AT LESS COST

because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

ARE PREFERRED BY OPERATORS

because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

IF YOUR PROBLEM INCLUDES

chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

THE MASTER PNEUMATIC TOOL COMPANY, INC.
ORWELL, OHIO • U. S. A.
SALES • SERVICE • STOCK • COAST TO COAST

SAVE "DOWN TIME" AND REPAIRS

AIR OUTLET ↓

AIR INLET ↓

←WATER EXHAUST

OPERATE AIR TOOLS WITH
CLEAN DRY AIR

★
USE MURPHY SEPARATORS
★

Employing four positive principles of separation, the Murphy "Type A" Separator carries a money-back guarantee to *deliver* clean, dry air to point of use. Completely automatic separation and ejection. No moving parts to receive wear. No filters to renew. Requires neither attention nor maintenance. Install it . . . and forget it; it's *guaranteed.* Write for literature and prices.

GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

JAS. A. MURPHY & CO.
FIFTH AND VINE STREETS, HAMILTON, OHIO
Moisture Elimination Up To 3000 Pounds Per Square Inch

IT'S NEW—IT'S SENSATIONAL

AMASTEEL
TRUALLOY
SHOT

LASTS MANY TIMES LONGER

Here is the peak efficiency in shot for BLAST CLEANING and PEENING.

AMASTEEL is much better than hard iron or malleable abrasives.

Investigate AMASTEEL Shot today. It lasts six times as long!

Inquire about our complete testing facilities and get a report on operating efficiency and life of any abrasive shot offered to you. Data gladly furnished. Our tests will save you money.

PRODUCERS OF
PEENBLAST
CLEANBLAST
ALLOY 99

ALLOY METAL ABRASIVE CO.
311 WEST HURON ST. ANN ARBOR, MICH.

No. 4 DAYTON RING VALVE
BENCH
RAMMER

MORE POWER—MORE SPEED

You'll get more production with these faster, more powerful rammers and at the same time substantially reduce maintenance costs.

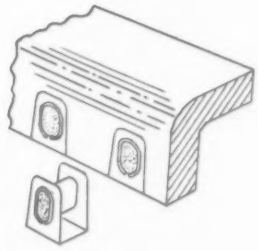
The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

Send for Bulletin 300

DAYTON PNEUMATIC TOOL CO.
Manufacturers of Pneumatic Tools Since 1903
DAYTON, OHIO

CHAPLETS

HINGE TUBES



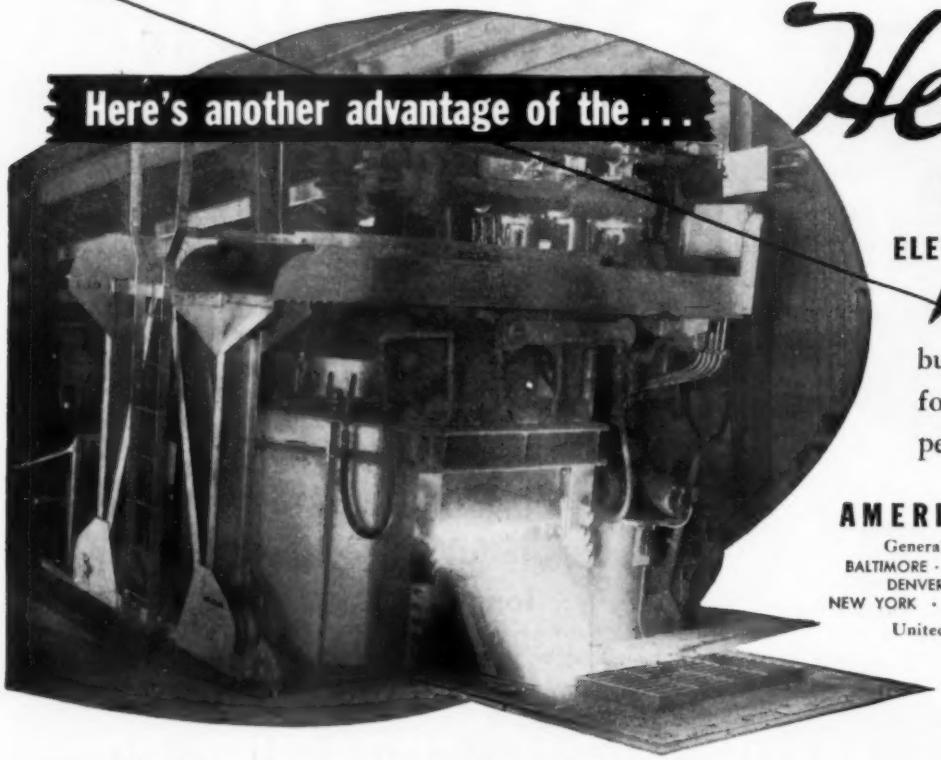
Provide an economical way of coring a clean, oval hole through ribs and flanges.

Here a costly hole to drill is formed cheaply and easily by an oval Hinge Tube.

Write for catalog No. 148-F

Smith & Richardson
MANUFACTURING COMPANY
MANUFACTURERS OF HINGE TUBES, CHAPLETS AND FOUNDRY SPECIALTIES
GENEVA • ILLINOIS

Here's another advantage of the . . .



Heroult

GANTRY-TYPE

ELECTRIC MELTING FURNACE

Mechanisms are precision built, gear driven throughout for maximum safety and dependability.

AMERICAN BRIDGE COMPANY

General Offices: *Frick Building, Pittsburgh, Pa.*

BALTIMORE · BOSTON · CHICAGO · CINCINNATI · CLEVELAND
DENVER · DETROIT · DULUTH · MINNEAPOLIS
NEW YORK · PHILADELPHIA · ST. LOUIS · SAN FRANCISCO

United States Steel Export Company, New York

Write for your free copy of the new Heroult Catalog.

AMERICAN BRIDGE COMPANY · USS Heroult FURNACES · UNITED STATES STEEL

UNITED STATES STEEL

PERMANENT MOLD SOIL PIPE FITTINGS

MODEL F

LOW RATE OF REJECTIONS

HIGH PRODUCTION • HIGH QUALITY
LOW COST WITH UNSKILLED LABOR

IDEALLY SUITED FOR

SOIL PIPE FITTINGS — Practically any shape of fitting or casting can be produced with or without cores.

Low cost green sand or dry sand cores

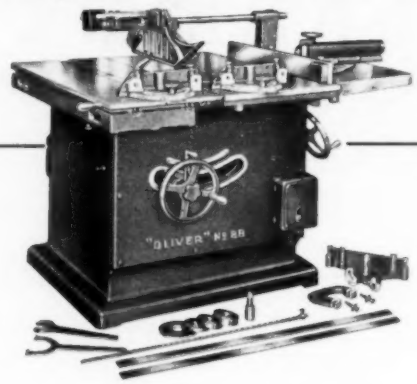
All Molds are Prepared and Tested Before Shipment

Write today for new illustrated bulletin No. 149

CENTRIFUGAL CASTING MACHINE CO.
P. O. Box 947 *Nathan Janco, Pres.* Tulsa 1, Okla.

"OLIVER"

Tilting Arbor Miter Saw



A large capacity, accurate machine for patternmakers

Saw arbor tilts to any angle up to 45°, permitting operator to rip, cross-cut, miter or dado at any angle or square while work remains flat on horizontal table. Carries saws up to 18" diameter. Has large table—plain or rolling type. Most complete set of accurately graduated gauges. Easy to adjust and operate. *Write for Bulletin No. 88D.*

OLIVER MACHINERY COMPANY
GRAND RAPIDS 2, MICHIGAN

Reduce Use of Chills in Gray Iron Casting

Now all you have to do to get hard chilled iron is add

TELLURIUM

Comes in 1, 2, 3 and 4-gram tablets; also in powder, slabs and sticks. For full information, write Dept. LM for 8-page article, "Use of TELLURIUM In Promoting Chills On Gray Iron Castings."

American Smelting and Refining Company

120 BROADWAY • NEW YORK 5, N.Y.

"BRANFORD" SHAKEOUTS

Here's how large and small foundries all over the country are saving money on flask shakeout operations.

"BRANFORD" FLASK RAPPERS shake out flasks cleaner, faster and with no flask damage.

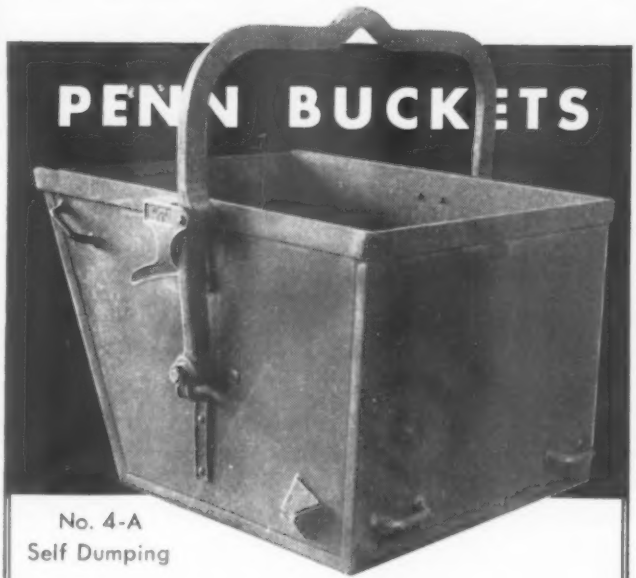
One large foundry reports: "BRANFORD Flask Rapping equipment paid for itself in three months by eliminating flask breakage".

Made in seven sizes to handle flasks from 20 inches square up to 20 feet by 24 feet by four feet deep—green or dry sand.

Jaws take wide variation of flask flanges.

The powerful, dependable units are easily and quickly moved from one station to another.

PENN BUCKETS



No. 4-A
Self Dumping

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely.

MEMBER

WRITE TODAY FOR NEW BULLETIN DIMENSION SHEET AND PRICE LIST

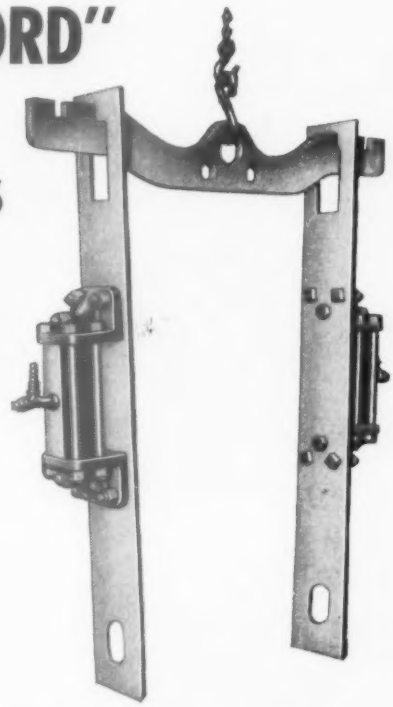
PENN IRON WORKS

READING, PENNA.

"BRANFORD" *Bail* Shakeouts

for repetition or jobbing work, are made in sizes to handle any job. We will furnish vibrators only or complete bail shakeouts.

Let us recommend and quote on your shakeout needs. Send for questionnaires.



"Vibration specialists since 1915"

1915 BRANFORD VIBRATORS U.S.A.

NEW HAVEN VIBRATOR CO.

130 CHESTNUT STREET NEW HAVEN 7, CONN.

LADLES

ALL CAPACITIES • ALL TYPES

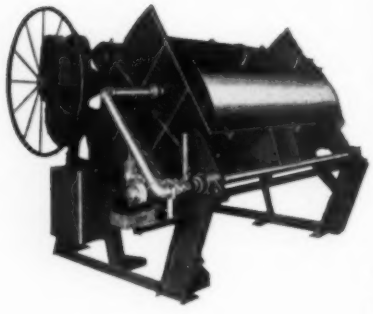
Including Timken worm geared Ladles with *Industrial's* patented distortion-proof, self-locking design

BOWLS

PRESSED STEEL
WELDED STEEL
RIVETED STEEL

Including

flat bottom, round bottom, and teapot spout types



SPECIAL EQUIPMENT

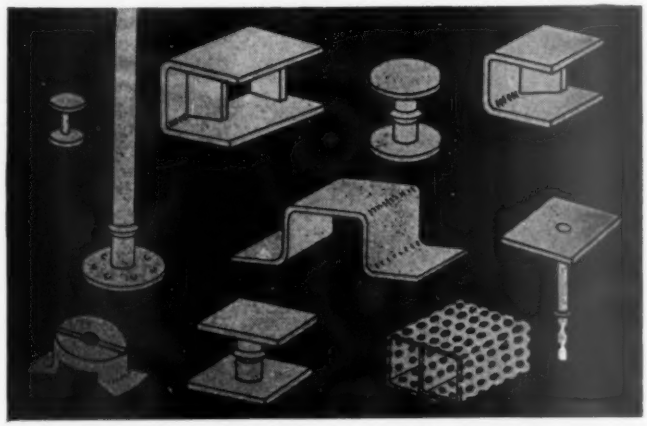
Special geared motor-driven mixing ladle, an example of custom-build pouring and handling equipment available at INDUSTRIAL

SHANKS, TONGS, BAILS and CUPOLA EQUIPMENT in ALL TYPES

Industrial
EQUIPMENT COMPANY
115 N. OHIO ST., MINSTER 2, OHIO

LATEST CATALOG AVAILABLE

There's always one Chaplet that's best for each job
ARE YOU SURE YOU'RE USING IT?



The large variety of "Buffalo" Chaplet designs enables you to meet your needs *exactly*. Given this broad selection, you are always assured of greater strength, easier burning-in and higher resistance to chilling for each specific job.

CATALOG NO. 15 offers complete details on designs, sizes and gauges. Copies mailed promptly. Samples of any "Buffalo" Chaplet will be gradly funished.

Combined SUPPLY & EQUIPMENT CO., INC.
211 CHANDLER ST., BUFFALO 7, N. Y.

TUMBLING BARRELS

Roller Bearing throughout
Direct Motor Drive with Speed Reducer
V Belt Motor Drive—Tight & Loose Pulley Drive

ROYERSFORD FOUNDRY & MACHINE CO.
BOX F
ROYERSFORD, PA.

EF

GAS, OIL AND ELECTRIC
FURNACES

For all annealing and heat treating requirements

THE ELECTRIC FURNACE CO. • SALEM, OHIO

What are you doing to correct your SCRAP LOSS?

CROBAUGH LABORATORIES

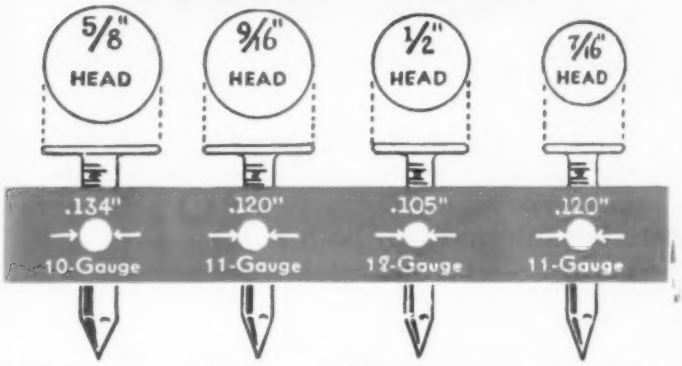
FOUNDRY CONSULTING and METALLURGICAL SERVICE

SAVES many times its cost

THE FRANK L. CROBAUGH COMPANY
1426 W. 3rd St. Cleveland 13, O. SU-4712
Over 50 years Service

ANGELL . . . PROVEN
PRESSURE PROOF CHAPLETS

Producers of SUPER HEAD FOUNDRY NAILS



5/8", 9/16" & 1/2" Heads available up to 3 inches in length

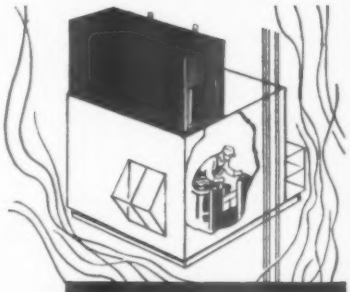
Standard Foundry Nails available in all lengths.

All styles of Chaplets Accurately Made for Better Castings

THE ANGELL NAIL & Chaplet Company
4580 East 71st Street
CLEVELAND 5, OHIO

Proved by
PERFORMANCE
in the **HOT** *spots*

- *Soaking Pit Cranes*
- *Ladle Cranes*
- *Charging Cranes*
- *Electric Furnace Cranes*
- *Forge Shop Cranes*
- *Stripper Cranes*
- *Monocast Cranes*
- *Reduction Plant Cranes*
- *Fabrication Shop Cranes*
- *Annealing Cranes*



DRAVO CRANE CAB COOLERS

REPEAT ORDERS from steel, iron and non-ferrous metal producers offer proof of the outstanding results where Dravo Crane Cab Coolers reduce fatigue and improve operator performance. It's worth your while to call or wire Dravo for case history details of these applications.

DRAVO CORPORATION
PITTSBURGH · PHILADELPHIA · CLEVELAND · NEW YORK
CHICAGO · DETROIT · ATLANTA · BOSTON
Sales Representatives in Principal Cities

DRAVO

Precision

CORE BOX VENTS

Here's part of a complete line of DEMMLER core box vents—rigidly constructed in varying sizes of slotted brass—slotted steel—and screen mesh. Orders filled promptly from stock.

BRASS SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

STEEL SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

SCREEN TYPE CORE BOX VENTS
Mesh: #30, #40, #50.
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

SPECIFICATION CIRCULAR ON REQUEST

Wm. **DEMMLER** *& Bros.*
Kewanee, Illinois

GLUTRIN
LIQUID BINDER

GOULAC
DRY BINDER

For

CORE WORK, SAND FACINGS, SPRAYS

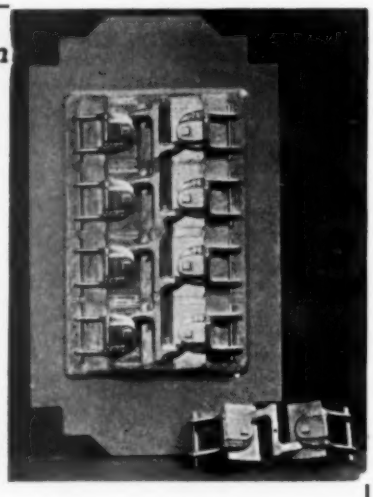
Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

Robeson Process Company
(Established 1905)

American Gum Products Co.
(Established 1915)

GENERAL OFFICES: 500 FIFTH AVENUE · NEW YORK 18, N. Y.

Where Production is the first Consideration, Pressure Cast Aluminum Matchplates and Cope and Drag Plates are the only Satisfactory Answer



Only one master pattern does it! From it we make you single or multiple pattern matchplates, casting them under pressure in plaster molds. Why not find out exactly how much we can save you by this method, or by furnishing cope and drag plates which likewise jump production and lower your costs?

Get our quotations today.

TOLEDO MATCHPLATE COMPANY
534 State Street Toledo 2, Ohio

Pressure-Cast MATCHPLATES
COPE and DRAG PLATES

CHEMISTS and METALLURGISTS
Grey Iron Foundry Consultants
Complete Foundry Testing
Established over 25 years
A. H. PUTNAM COMPANY
Rock Island, Illinois

RAPPING PLATES
MANUFACTURED BY
PACIFIC GRAPHITE COMPANY INC.
40TH AND LINDEN STREETS - OAKLAND 8, CALIFORNIA

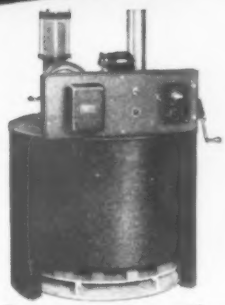
USE COST-CUTTING
Electro SINCE 1919
TERCOD CRUCIBLES
and Electro
SNAGGING WHEELS
Write for
BULLETIN CR-147 ON CRUCIBLES AND GRINDING WHEEL MANUAL NO. 645

Electro REFRACTORIES & ALLOYS CORP.
Mfrs. • Kiln Furniture • Refractories • High Temperature Cements
344 DELAWARE AVE. (High Speed Grinding Wheels) BUFFALO 2, N. Y.
West Coast Warehouse, Los Angeles, Calif.

Save in the Core Room *Reduce* Core Losses

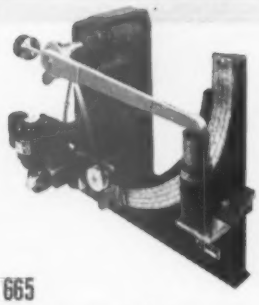
No. 620 Impact Tester

Most cores must be transported from core making station to oven in the green condition, and are subjected to many impacts or jolts in the process. Improve core mixtures for sagging resistance, overhang ability, and cracking resistance. Use the Dietert-Detroit No. 620 Impact Tester to improve core mixtures and help core production.



No. 606 Test Core Baking Oven

Determine the uniformity, quality, economy and best baking conditions for Core Binders. The Dietert-Detroit Test Core Baking Oven does this by producing selected, controlled baking conditions day after day. Meets A.F.S. Specifications.



No. 665 Green Core Strength Accessory

This Accessory, which easily attaches to The Universal Sand Strength Machine, enables you to measure the green strength of core mixtures with precision, within 0.01 psi. By using it, you can institute practices to supply the core maker with sand that works the same from batch to batch. The Green Compressive Strength of the core mixture determines the stand-up ability of a green core.

CONTROL EQUIPMENT
SAND · MOLD · MOISTURE
CARBON · SULFUR

HARRY W. Dietert COMPANY

9330 ROSELAWN AVE. • DETROIT 4, MICHIGAN

HAMILTON SPRAY GUN

COMPLETE
WITH 4½ FT. SUCTION HOSE
AND SINKER

$10.00

F.O.B. HAMILTON, OHIO

For spraying molds and cores with any liquid. For cleaning electric motors, gasoline motors and machinery. For laying dust.

Neoprene disc valve. Trigger control. Sturdy brass construction. Length overall 6½". Weight without suction hose and sinker 18 oz. Two nozzle sizes, ⅛" and ¼". Literature on request.

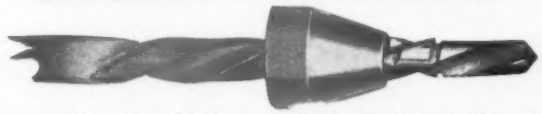
GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

JAS. A. MURPHY & CO.
FIFTH AND VINE STREETS, HAMILTON, OHIO
Moisture Elimination Up To 3000 Pounds Per Square Inch

SERVING YOU
in
"Core Blowing Operations"

INSERTING DRILL



• Uniformity of holes • Faster insertion of vent
• Correct Depth

CORE BOX VENTS

DEEP HEAD
Wide or Narrow Slots
.014 .010

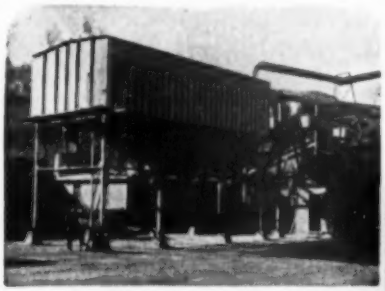
SHALLOW HEAD
Wide or Narrow Slots
.014 .010

MESH
.035

VENT CLEANER

for Cleaning Slots
Made of Tempered Steel, Easy to Use

C. M. SMILLIE & CO.
1124 WOODWARD HGTS., FERNDALE 20, MICHIGAN
TOOLS • PRECISION MACHINED and GROUND PARTS • FIXTURES



28 years experience in designing, building and installing dust-control equipment is at your service. Call for one of our engineers, or write for free booklet . . . "Mastery of the Air".

SAND BLASTING EQUIPMENT

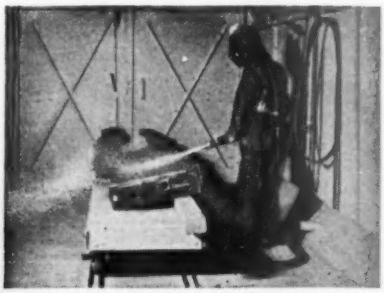
•DUST ARRESTORS•

Reasonable Delivery.

Parsons

ENGINEERING CORP.

2545 EAST 79th ST. CLEVELAND 4, OHIO



Parsons blast rooms, suction cabinets, oscillating blast barrels and accessories, do the job faster . . . better. Custom built to give year after year service, and trouble-free operation.

LIGHT CUPOLAS • DRY MOLDS

FASTER • EASIER • CHEAPER

HAUCK *Portable* OIL BURNERS

Start cupola fires quickly, evenly, under any weather conditions at lower cost than with wood. No smoke or fumes. Promote efficiency.

Instantly regulatable flame (1700° to 2100°) dries any size molds. Lightweight, easy to handle, convenient.

Used with compressed air or in hand pump types, fuel tank capacities from ½ to 20 gal. Other Hauck equipment for ladle heating, preheating furnace linings, etc.

Write for Catalog

HAUCK MFG. CO. 106 Tenth St., Brooklyn 15, N. Y.

AMERICAN BRITISH CHEMICAL SUPPLIES, Inc.

180 MADISON AVE. NEW YORK 16, N. Y.

A. B. C. FOUNDRATES-FLUXES & COATINGS

for Aluminum—Brass—Bronze & Grey Iron are made of

DEPENDABLE COMPOSITION under LABORATORY CONTROL

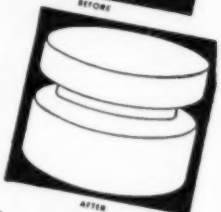
at our plant Kay Fries Chemicals Co. West Haverstraw, N. Y.

PRODUCERS CORE SAND CORPORATION

PITS AT MICHIGAN CITY, INDIANA AND SAWYER, MICHIGAN

MICHIGAN CITY, INDIANA

For Surface Blemishes in ALUMINUM CASTINGS



Have you used the Smooth-On Foundry Cement made especially to correct blow holes, porous and rough spots, dents and other unsightly but harmless surface defects in otherwise sound *aluminum* alloy castings?

Applied like the widely used Smooth-On *Iron* Foundry Cement, Smooth-On No. 8 *Aluminum* Cement fills in evenly, hardens quickly, matches perfectly. Stays in place, too, for it expands slightly as it sets.

Smooth-On No. 8 Aluminum Cement comes in 1-and 5-lb. sizes. 1 lb. will fill 17 cu. in. Order it by NAME AND NUMBER from your supply house. If they haven't it, write us. If you have not yet discovered Smooth-On No. 8, ask us for

FREE SAMPLE TO TEST

You'll receive also the famous 40-page SMOOTH-ON HANDBOOK, filled with industrial uses for the various Smooth-On Cements. 170 illustrations. Write today.

SMOOTH-ON MFG. CO., Dept. 17
570 Communipaw Ave., Jersey City 4, N. J.

Do it with **SMOOTH-ON**

No. 8 ALUMINUM CEMENT

GREENE FURNACES

Economy size Greene Arc Furnaces for small iron foundries include simplified Top-Charge and Roof structure; operate on standard low voltage power, 110, 220 or 440.
Type V-3, 200 KW Furnace melts 600 Lbs. per hour.

GREENE ELECTRIC FURNACE CO.

2702 6th So. Seattle 4, Washington

MODERN BLAST CLEANING AND VENTILATION

By C. A. Reams

Casting cleaning methods presented and discusses in detail. Also abrasive selection and use.

★ 200 pages
★ 28 tables
★ 38 illustrations

Price, Postpaid $4.00

THE PENTON PUBLISHING CO.

1213 W. 3rd St., Book Department Cleveland 13, Ohio

PURO-SEAL FLUX

for producing **BETTER BRASS** *and* **ALUMINUM CASTINGS**

★

Write for Particulars and TRIAL SAMPLE.

BALANCED FLUX

PURO SEAL

FOR THE PURIFICATION OF METALS

THE PURO-SEAL COMPANY

2373 WEST 3rd STREET · CLEVELAND 13, OHIO

"BABY" THOSE CORES

with CMD

PNEUMATIC CORE TRUCKS

The resilient construction of CMD Pneumatic Core Trucks absorbs all shocks and bumps—protects cores from costly chafing and breaking, carries them as gently as a baby carriage. Pneumatic tires and *exclusive* inner coil springs in the upright supports assure fast, safe transporting of cores from the core room to the foundry.

MODEL A-27 (illustrated above) Carries heavy loads easily. Has heavy duty elliptical springs, inner coil springs (in the upright supports) and pneumatic tires. Sizes: 27" x 60", 1000 lbs. capacity; 27" x 72", 1,200 lbs.; 27" x 84", 1,400 lbs. Other models available to meet the needs of every foundry; with capacities from 500 lbs. up.

Write today for FREE circular 150-F on CMD Core Trucks, Barrows and other foundry specialties.

CMD

CHICAGO MANUFACTURING & DISTRIBUTING CO.
1928 West 46th Street **Chicago 9, Illinois**

Measure Foundry Temperatures Accurately . . . at a glance!

Use the Simplified PYRO Optical Pyrometer

Any operator can quickly determine temperatures of minute spots, fast-moving objects and smallest streams with the simplified PYRO Optical Pyrometer. Completely self-contained—no calibration charts or accessories needed. An accurate, DIRECT-READING instrument that will pay for itself many times over by helping prevent spoilage. Weighs just 3 lbs. Available in 5 ranges (1400° to 7500° F.) *Write for FREE CATALOG #80, today!*

For Non-Ferrous Foundries . . . the PYRO IMMERSION PYROMETER

Helps insure low-cost production of SOUND, UNIFORM Castings. Has shielded steel housing which is shock-proof, dust-proof and moisture-proof—withstands roughest handling. "Protected Type" and "Bare Metal" thermocouples are instantly interchangeable, without adjustment or recalibration. Large 4-inch easy-reading dial. Equipped with exclusive LOCK SWIVEL. Ranges: 1-1500° and 0-2500° F. *Write for FREE Catalog #150*

THE PYROMETER INSTRUMENT CO.
New Plant & Lab.
Bergenfield 6, New Jersey.

FROM THE TOP IT LOOKS LIKE THIS

An Important Contribution to Better Castings

The Open Head design enables you to pack sand sounder under head and around the stem, and forms a more rigid support for chaplet and cores. The result: reduced profit losses through casting rejects.

We also make MOTOR CHAPLETS

BOILER CHAPLETS,
FORGED HEAD CHAPLETS,
FITTED HEAD CHAPLETS,
DOUBLE HEAD CHAPLETS
and other types.

CLEVELAND CHAPLET & MFG. CO.
West 67th St. & N. Y. C. Ry.
CLEVELAND, OHIO

CLEVELAND *Chaplets*
Since 1890

10 GRADES OF WASHED, DRIED, SCREENED
SILICA FOUNDRY SANDS
Produced from celebrated Ottawa District St. Peter Sandstone • Rounded Grains
Steel Molding Sand • Core Sand • Blast Sand • Furnace Bottom Sand
Opener Sand • Sand for Non-Ferrous, Aluminum, Magnesium Castings
MICROSIL Ground Silica (5 Standard Grades of Silica Flour)

MICROSIL GROUND SILICA

STANDARD SILICA CORPORATION
209 South LaSalle Street, Chicago • and • Ottawa, Illinois
DISTRIBUTORS IN ALL PRINCIPAL CITIES

BLACKHAWK SILICA SAND

EMPIRE THAT GOOD **By-Product Coke:**
★ FOR FOUNDRY • METALLURGICAL • CHEMICAL • WATER GAS • DOMESTIC USES ★
PHONE 3-9135
DEBARDELEBEN COAL CORPORATION
Transportation Building BIRMINGHAM 3, ALA.
DeBardeleben Preparation and Service Give Added Value

MONK MOLDERS TOOLS
THE COMPLETE LINE IMMEDIATE DELIVERY
THE MONK TOOL CO. Union St., Geneva, Ill.
BRASS GATE CUTTER FREE WITH ORDERS MARKED ADV49

HERBERT F. MILLER
Consultant in Management and Foundry Engineering
30 years successful operating experience in
Gray Iron, Malleable Iron and Steel
2130 Melrose Street, Rockford, Illinois

Write, Wire or Phone for Prompt Service
DETROIT SHEET METAL WORKS
1306 Oakman Boulevard DETROIT 6, MICHIGAN
Eastern Rep. R. W. RICHARDS CO., RIDGEWOOD, N. J.

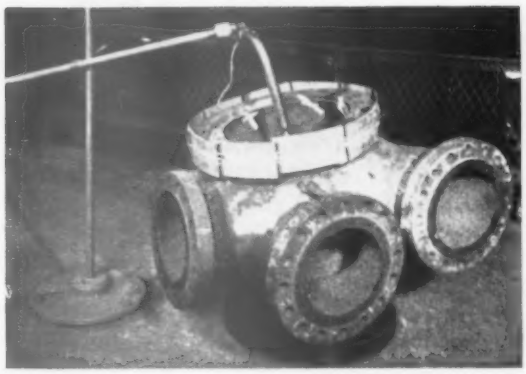
ANALYSIS OF CASTING DEFECTS
133 pages, illustrated
Price $4.25 Postpaid
To help foundrymen minimize and eliminate defective castings. Thirty-one basic casting defects are listed and described. Defects are defined simply and completely, illustrated by 101 figures collected from foundries of the United States and Canada.
THE PENTON PUBLISHING COMPANY
Book Department
1213 W. 3rd St., Cleveland 13, Ohio

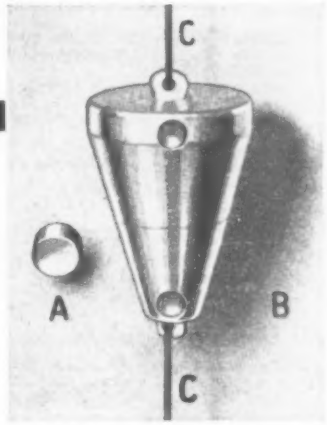
WILLIAMS *Buckets*

"HOOK-ON" SINGLE LINE
Special Type for
FOUNDRY SERVICE
3/8 to 2 cu. yd. cap.
Send for descriptive bulletin.
THE WELLMAN ENGINEERING CO.
7019 Central Ave. Cleveland, Ohio
***built by* WELLMAN**

BUY, RENT OR LEASE OUR RADIUM RADIOGRAPHY KIT

and make a short cut to more productive and economical foundry practice





The apparatus is as simple as
A—small radium capsule
B—cartridge container
C—rigid string support

The use of gamma rays in radiographing steel castings has increased by leaps and bounds since 1930, when the first commercial use of radiography was marked by a picture of the sternpost of the cruiser "Chester". Radium radiography is simple, economical and effective; because it may be rented or leased, the equipment doesn't require a capital investment. Because it is simple to operate, it doesn't require especially skilled operators. By 1948 200 steel foundries were renting or leasing radium from the Radium Chemical Co., Inc., and today radium radiography is rapidly approaching the status of standard equipment in progressive steel foundries. Photograph shows a simple method for radiographing a flange on a heavy steal casting. Let us tell you more about the simplicity and economy of radium radiography; write today for prices, terms and case histories.

RADIUM CHEMICAL CO., INCORPORATED

570 LEXINGTON AVE., N. Y. (22) N. Y. CHICAGO: MARSHALL FIELD ANNEX BLDG.
3723 WILSHIRE BLVD., LOS ANGELES 5, CAL.

A BLAST FURNACE PRODUCT

Smelted from Superior quality lake ores, high grade metallurgical coke and limestone, using our own local No. 1 Sharon Seam coal.

HIGH SILICON IRON JISCO

A "blend" with JISCO is sound metallurgy.

THE JACKSON IRON & STEEL *Company*
JACKSON, OHIO

MAUGHLIN
PATTERN LETTERS AND MONOGRAMS

A Hammer Blow Secures Letters To Pattern

The Maughlin Pattern Letters are made of hard aluminum alloy to withstand severe usage and have a number of points on the underside so they can be attached permanently to the pattern.

Industries of the United States and Foreign Countries are using Maughlin Pattern Letters With The Points. Some, who formerly cast their own letters of lead, have found it to be much more economical to use the Pattern Letter With The Points.

Our facilities for making special dies for Monograms & Trade Marks are of the finest, enabling us to quote you extremely low prices.

The COST of the Pattern makers time alone applying lead letters to a pattern, EXCEEDS the cost of the Maughlin Pattern Letter.

Large Stock Carried assuring immediate delivery.

THE H. P. MAUGHLIN CO.
953 Ingleside Ave., Columbus, Ohio

Manufacturers of letters and numbers exclusively for over 30 years

WHERE-TO-BUY

The following classified list of products of the advertisers in THE FOUNDRY is conducted for the convenience of our readers in quickly locating sources of foundry equipment and supplies

ABRASIVE (Bricks and Files)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Niagara Falls, N. Y.
Norton Co., Worcester 6, Mass.
Sterling Grinding Wheel Div., Cleveland Quarries Co., Tiffin, O.

ABRASIVE BELTS

Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

ABRASIVE CLOTH and PAPER

Behr-Manning Div. of Norton Co., Worcester 6, Mass.
Carborundum Co., Niagara Falls, N. Y.
Minnesota Mining & Mfg. Co. 900 Fauquier St., St. Paul 6, Minn.

ABRASIVE CUTOFF MACHINES

Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

ABRASIVE DISCS

Skilsaw, Inc., 5000 N. Elston, Chicago 30, Ill.

ABRASIVE (Metallic)—See SHOT and GRIT

ABRASIVE WHEELS

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Norton Company, Worcester 6, Mass.
Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Sterling Grinding Wheel Div., Cleveland Quarries Co., Tiffin, O.
United States Rubber Co., 4300 New Haven Ave., Fort Wayne 4, Ind.

ACETYLENE (Cylinders and Tanks)

Air Reduction Sales Co., 60 East 42 St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

AERATORS

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Jeffrey Mfg. Co., Columbus 16, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.

AFTERCOOLERS (Compressed Air)

Jas. A. Murphy & Co., Hamilton, O.

AIR COMPRESSORS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Campbell-Hausfeld Co., Harrison, O.
Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis, Mo.
Fuller Company, Catasauqua, Pa.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

AIR COMPRESSORS (Cont'd.)

Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Schramm Inc., West Chester, Pa.
Spencer Turbine Co., Hartford, Conn.

AIR CONDITIONING EQUIPMENT

American Air Filter Co., Inc., 266 Central Ave., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis, Mo.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.

AIR CONTROL EQUIPMENT

Air-Way Pump & Equipment Co., 1050 N. Kilbourn, Chicago, Ill.
American Air Filter Co., Louisville 8, Ky.
Foxboro Company, Foxboro, Mass.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Murphy, Jas. A., & Co., Hamilton, O.

AIRLESS BLAST CLEANING EQUIPMENT

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W. 4753 Train Ave., Cleveland 2, O.

AIR LINE LUBRICATORS

Cleco Division of Reed Roller Bit Co., Houston, Tex.

ALLOYS

Ajax Metal Co., 46 Richmond St., Philadelphia 23, Pa.
Federated Metals Div.
American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.
Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Globe Iron Co., Jackson, Ohio
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Molybdenum Corporation of America, Pittsburgh 19, Pa.
Niagara Falls Smelting & Refining Div., Continental-United Industries Co., Inc., 2204 Elmwood Ave., Buffalo 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, O.

ALLOYS (Ferro)

Electro Metallurgical Div. Union Carbide & Carbon Corp. 30 E. 42nd St., New York 17, N. Y.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Keokuk Electro Metals Co., Keokuk, Iowa
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro-Alloys Corp., Canton 2, Ohio
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

ALUMINUM and ALUMINUM ALLOYS

Ajax Metal Co., 46 Richmond St., Philadelphia 23, Pa.
Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.
Federated Metals Division, American Smelting and Refining Co., 120 Broadway, New York 5, N.Y.

ALUMINUM and ALUMINUM ALLOYS (Cont'd.)

Niagara Falls Smelting & Refining Div., Continental - United Industries, Co., Inc., 2204 Elmwood Ave., Buffalo 17, N. Y.
Sonken-Galamba Corp., Kansas City 18, Kansas.
Western Metals Co., 3201 So. Kedzie Ave., Chicago 23, Ill.

ALUMINUM INGOTS

Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.
Cleveland Electro Metals Co., West 38th St. & NP R. R., Cleveland 13, O.
Niagara Falls Smelting & Refining Div., Continental - United Industries Co., Inc., 2204 Elmwood Ave., Buffalo 17, N. Y.
Western Metals Co., 3201 So. Kedzie Ave, Chicago 23, Ill.

ANNEALING BASKETS

Pressed Steel Co., Wilkes-Barre, Pa.

ANNEALING BOXES

Pressed Steel Co., Wilkes-Barre, Pa.

ANNEALING CORES

Pressed Steel Co., Wilkes-Barre, Pa.

ANNEALING FURNACES (Electric)

Ajax Electrothermic Corp., Trenton, N. J.
General Electric Co., Schenectady, N Y.

ANNEALING POT RAPPERS

New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.

ANNEALING TUBES

Pressed Steel Co., Wilkes-Barre, Pa.

ARGON

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co. 30 E. 42nd St., New York 17, N. Y.

ARRESTORS (Dust)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Kirk & Blum Mfg. Co., Cincinnati 25, Ohio.
Pangborn Corp., Hagerstown, Md.

ASSOCIATIONS

American Foundrymen's Society, 222 W. Adams St., Chicago 6, Ill.
Crucible Manufacturers Association, 90 West St., New York 6, N. Y.

BAND SAWS

Atlantic Saw Mfg. Co., New Haven, Conn.

BANDS (Snap Flask)

Adams Co., Dubuque, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

BARS (Steel)

Republic Steel Corp., 3100 E. 45th St., Cleveland 4, Ohio.

BASKETS (Annealing)

Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.
Pressed Steel Co., Wilkes-Barre, Pa.

BEARINGS (Anti-Friction, Roller and Ball)

Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Timken Roller Bearing Co., Canton 6, O.

BELTING (Conveyor, Elevator)

Hewitt Rubber Div. Hewitt-Robins Div., Inc., 240 Kinsington Ave., Buffalo 5, N. Y.
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago 23, Ill.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Raybestos-Manhattan Inc., Manhattan Rubber Division, Passaic, N. J.

BELTS (Abrasive)

Minnesota Mining & Mfg. Co. 900 Fauquier St., St. Paul 6, Minn.

BELTS (Power Transmission)

Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago 23, Ill.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Raybestos-Manhattan Inc., Manhattan Rubber Division, Passaic, N. J.

BENTONITE

American Colloid Co., 363 W. Superior St., Chicago 10, Ill.
Baroid Sales Division, 830 Duncommun St., Los Angeles 12, Calif.
Eastern Clay Products, Inc., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.

BINS (Storage)

American Bridge Co., Pittsburgh 19, Pa.
Bartlett & Snow, C. O. Co., 6201 Harvard Ave., Cleveland 5, O.
Neff & Fry, Camden, O.

BLACKING (Mold Core)

Asbury Graphite Mills Asbury, N. J.
Bloomsbury Graphite Co., Bloomsbury, N. J.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Stevens, Frederic B., Inc., Detroit 16, Mich.
United States Graphite Co., Saginaw, Mich.

BLASTING EQUIPMENT

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

BLAST METERS

Foxboro Company, Foxboro, Mass

BLOWERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Campbell Hausfeld Co., Harrison, O.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.

BLOWERS (Cont'd.)

Joy Mfg. Co., La-Del Division, New Philadelphia, Ohio.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Standard Stoker Co., Inc., 1701 Gaskell Ave., Erie, Pa.
Stroman Furnace & Engineering Co., Division of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

BOLTS and NUTS

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Republic Steel Corp., 3100 E. 45th St., Cleveland 4, Ohio.

BOND CLAY

American Colloid Co., 363 W. Superior St., Chicago 10, Ill.
Baroid Sales Division, 830 Ducommun St., Los Angeles 12, Calif.
Eastern Clay Products Inc., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Ironton Fire Brick Co., Ironton, O.

BOOKS (Technical)

Penton Publishing Co., 1213 West 3rd St., Cleveland 13, O.

BOTTOM PLATES and BOARDS

Adams Co., Dubuque, Iowa.
Black, Sivalls & Bryson, Inc., 720 Delaware, Kansas City 6, Mo.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Dougherty Lumber Co., 4300 East 68th St., Cleveland 5, O.
Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.

BOWLS and SHANKS

Industrial Equipment Co., Minster, Ohio.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

BOXES (Annealing)

Pressed Steel Co., Wilkes-Barre, Pa.

BOXES (Tote)

Penn Iron Works, Reading, Pa.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Sterling Wheelbarow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.

BRAKES (Magnetic)

Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

BRICK (Refractory)

Carborundum Co., Perth Amboy, N. J.
A. P. Green Fire Brick Co., Mexico, Missouri.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.
Robinson Clay Product Co., 65 West State St., Akron 8, Ohio.
Chas. Taylor Sons Co., P. O. Box 58, Annex Sta., Cincinnati 14, Ohio.

BRIQUETS (Alloy)

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, Ohio

BRIQUETS (Ferro Alloy)

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, Ohio

BRIQUETS (Silicon Carbide)

Carborundum Co., Perth Amboy, N. J.

BRIQUETING MACHINERY (Metal)

Milwaukee Foundry Equipment Co., 3328 Pierce St., Milwaukee 4, Wis.

BRUSHES

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

BUCKETS (Elevating, Clam Shell, Drag Line, Grab, Loader, Dumping)

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.
Erie Steel Construction Co., Erie, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Penn Iron Works, Reading, Pa.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BUILDING and ENGINEERING SERVICE

American Bridge Co., Pittsburgh 19, Pa.

BURNERS (Acetylene, Oil, Gas, Powdered Coal, Stoker)

Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.

BUSHINGS (Blow-plate)

Martin Engineering Co., Kewanee, Ill.

BUSHINGS (Flask-Pin)

Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Smillie & Co., C. M., 1100 Woodward Hgts. Blvd., Ferndale, Mich.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Universal Engineering Co., Frankenmuth, Mich.

CALCIUM BORIDE

Molybdenum Corporation of America, Pittsburgh 19, Pa.

CALCIUM MOLYBDATE

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corporation of America, Pittsburgh 19, Pa.

CARBON BOOSTER

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

CARS (Core Oven)

Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

CARS (Mold Drying)

Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

CASTINGS

City Pattern Foundry & Machine Co., 1165 Harper Ave., Detroit 11, Mich.
Wheland Co., Chattanooga, Tenn.

CASTING MACHINES (Centrifugal)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Centrifugal Casting Mach. Co., Tulsa, Okla.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

CASTING MACHINES (Permanent Mold)

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

CASTING SEALER

Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.
Tousey Varnish Co., 520 West 25th St., Chicago 16, Ill.

CASTINGS (Permanent Mold)

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

CEMENT (Metallic)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Smooth-On Manufacturing Co., 570 Communipaw Ave., Jersey City 4, N. J.

CEMENT (Refractory)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Perth Amboy, N. J.
A. P. Green Fire Brick Co., Mexico, Missouri.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Ironton Fire Brick Co., Ironton, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Norton Co., Worcester 6, Mass.
Robinson Clay Product Co., 65 West State St., Akron 8, Ohio.

CEREAL BINDERS

Foundry Service Co., Birmingham, Ala.
Chas. A. Krause Milling Co., 404 East State St. Milwaukee, Wis.

CHAIN (Hoist, Conveyor, Drive, Sling, etc.)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Chain Mfg. Co., Broadway & Henry Sts., Cleveland 5, Ohio.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Taylor Chain Co., S. G., Hammond, Ind.

CHAIN (Steel Loading)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Chain Mfg. Co., Broadway & Henry Sts., Cleveland 5, Ohio.
David Round & Sons, Broadway & Henry Sts., Cleveland 5, Ohio.

CHAIN (Welded and Weldless)

Chisholm-Moore Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Chain Mfg. Co., Broadway & Henry Sts., Cleveland 5, Ohio.

CHAINS (Sling)

Cleveland Chain Mfg. Co., Broadway & Henry Sts., Cleveland 5, Ohio.

CHAPLETS

Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, Ohio.
Cleveland Chaplet & Mfg. Co., 1197 W. 67th St., Cleveland 2, O.
Combined Supply & Equipment Co., Inc., 215 Chandler St., Buffalo 7, N. Y.
Crescent Brass & Pin Co., 5766 Trumbull Ave., Detroit, Mich.
Fanner Mfg. Co., Brookside Park, Cleveland 2, Ohio.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O
Foundry Service Co., Birmingham, Ala.
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee 4, Wis.
Smith & Richardson Mfg. Co., Geneva, Ill.
Frederic B. Stevens, Inc., Detroit 16, Mich.

CHARCOAL

Tennessee Products & Chemical Corp., American National Bank Bldg., Nashville 3, Tenn.

CHARCOAL (Briquets)

Ford Motor Co., Iron Mountain, Mich.

CHEMICALS

Hercules Powder Co., Wilmington 99, Del.
Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.

CHEMISTS

Crobaugh Co., Frank L., 1426 West Third St., Cleveland 13, Ohio.

CHILLS

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, Ohio.
Fanner Mfg. Co., Brookside Park, Cleveland 2, Ohio.
Milwaukee Chaplet & Mfg. Co., 1023 So. 40th St., Milwaukee 4, Wis.
Standard Horse Nail Corp., New Brighton, Pa.

CHILL COATINGS

Acheson Colloids Corp., Port Huron, Mich.

CHILL NAILS

Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, Ohio.
Standard Horse Nail Corp., New Brighton, Pa.

CHIPPERS—See PNEUMATIC TOOLS

CHISELS (Chipping)

Arrow Tools, Inc., 1900 S. Kostner, Chicago, Ill.
Cleco Division of Reed Roller Bit Co., Houston, Texas.

CHROMIUM (Briquets)

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

CLAMPS (Flask)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Sterling Wheelbarrow Co., 1700 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.

CLAMPS (Permanent Mold)

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

CLAY (Bonding)

American Colloid Co., 363 W. Superior St., Chicago 10, Ill.
Carpenter Brothers, Inc., 606 West Wisconsin 3, Mo.
Baroid Sales Division, 830 Ducommun St., Los Angeles 12, Calif.
Eastern Clay Products, Inc., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.

CLAY (Refractory)

Carpenter Brothers, Inc., 606 West Wisconsin 3, Mo.
Eastern Clay Products Inc., Jackson, O.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., Joliet, Ill.
Chas. Taylor Sons Co., P. O. Box 58, Annex Sta., Cincinnati 14, Ohio.

CLAY STORAGE BINS

Neff & Fry, Camden, O.

CLEANING EQUIPMENT (Castings)

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
N. Ransohoff, Inc., 16 E. 72nd St., Cincinnati 16, Ohio.

CLUTCHES (Magnetic)

Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 622 S. 28th St., Milwaukee 4, Wis.

COAL STORAGE BINS

Neff & Fry, Camden, O.

COBALT (Radio Active)

Eldorado Mining & Refining Ltd., P. O. Box 379, Ottawa, Ont.

COKE (Foundry)

DeBardeleben Coal Corp., 2201 First Ave., N., Birmingham 3, Ala.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Pickands, Mather & Co., Cleveland 14, O.
Republic Coal & Coke Co., 8 So. Michigan Ave., Chicago 3, Ill.
Semet-Solvay Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Tennessee Products & Chemical Corp., American National Bank Bldg., Nashville 3, Tenn.

COKE (Petroleum)

Republic Coal and Coke Co., 8 S. Michigan Ave., Chicago 3, Ill.

COLLECTORS (Dust)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Bartlett & Snow, C. O. Co., 6201 Harvard Ave., Cleveland, O.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
Schmieg Industries, 302 Piquette St., Detroit 2, Mich.
Schneible Co., Claude B., 2827-25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

CONCRETE STORAGE BINS

Neff & Fry Co., Camden, O.

CONTROL SYSTEMS (Dust)

American Air Filter Co., 223 Central Ave., Louisville, Ky.

CONTROL SYSTEM (Dust) (Cont'd.)

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Schmieg Industries, 302 Piquette St., Detroit 2, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

CONVERTER BLOWERS

Roots-Connersville Blower Corp., Connersville, Ind.

CONVERTERS (Bessemer)

Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CONVEYOR DESIGN

Frank D. Campbell, 332 So. Michigan Ave., Chicago, Ill.
Giffels & Valet, Inc., Marquette Bldg., Detroit, Mich.

CONVEYORS (Apron)

Logan Co., 580 Cabel, Louisville, Ky.

CONVEYORS (Belt)

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago 23, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Chain)

Chain Belt Co., 1671 W. Bruce St. Milwaukee 4, Wis.
Jeffrey Mfg. Co., 907-99 N. Fourth St. Columbus 16, O.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Standard Conveyor Co., North St. Paul 9, Minn.
Jervis B. Webb Co., 8951 Alpine, Detroit 4, Mich.

CONVEYORS (Gravity)

Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Live Roller)

Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Magnetic)

Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

CONVEYORS (Monorail)

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.

CONVEYORS (Monorail) (Cont'd.)

Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 E. 283rd St., Wickliffe, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., 104 Tenth St. Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Penn Iron Works, Reading, Pa.

CONVEYORS (Overhead)

Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Jervis B. Webb Co., 8951 Alpine, Detroit 4, Mich.

CONVEYORS (Pneumatic)

Fuller Company, Catasauqua, Pa.

CONVEYORS (Portable)

Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

CONVEYORS (Portable-Gas Electric)

Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

CONVEYORS (Rubber)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Vibrating)

Ajax Flexible Coupling Co., Westfield, N. Y.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Simplicity Engineering Co., Durand, Mich.
Syntron Company, Homer City, Pa.

COPPER

Federated Metals Div.
American Smelting and Refining Co., 120 Broadway, New York 5, N.Y.

COPPER SHOT

Federated Metals Div.,
American Smelting and Refining Co., 120 Broadway, New York 5, N.Y.
Niagara Falls Smelting & Refining Div., Continental-United Industries Co., Inc., 2204 Elmwood Ave., Buffalo 17, N. Y.

CORE BINDERS

American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y.
American Gum Products Co., 500 Fifth Ave., New York 18, N. Y.
Bakelite Corp., 300 Madison Ave. New York 17, N Y.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Corn Products Sales Co., 17 Battery Pl., New York 4, N.Y.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
General Electric Co., Pittsfield, Mass.
Hercules Powder Co., Wilmington 99, Del.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Chas. A. Krause Milling Co., 404 E. State St., Milwaukee 1, Wis.
Robeson Process Co., 500 Fifth Ave., New York 18, N. Y.

CORE BINDERS (Cont'd.)

Superior Flake Graphite Co. 33 So. Clark St., Chicago 3, Ill.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 330 E. Grand Ave., Chicago 11, Ill.

CORE BLOWER BUSHINGS

Eastern Clay Products, Inc., Jackson, Ohio.
Martin Engineering Co., Kewanee, Ill.

CORE BLOWING MACHINES

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Wm. Demmler & Bros., Kewanee, Ill.
Federal Foundry Supply Co. 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.
International Molding Machine Co., LaGrange Park, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

CORE BOXES

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.
Plastic Corp. of Chicago, 2444 So. Central Ave., Cicero 50, Ill.

CORE COMPOUND

Bakelite Corp., 300 Madison Ave. New York 17, N. Y.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Velsicol Corp., 330 E. Grand Ave., Chicago 11, Ill.

CORE DRAWING MACHINES

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., Toledo 5, O.
Newaygo Engineering Co., Newaygo, Mich.

CORE DRIERS (Dielectric)

Allis Chalmers Mfg. Co., Milwaukee 1, Wis.

CORE GRINDERS (Power Operated)

Jeffrey Mfg. Co., Columbus 16, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.

CORE KNOCKOUT MACHINES

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Pangborn Corp., Hagerstown, Md.
Simplicity Engineering Co., Durand, Mich.

—When writing advertisers, please mention THE FOUNDRY—

CORE MAKING MACHINES

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Wm. Demmler & Bros., Kewanee, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3228 W. Pierce St., Milwaukee 4, Wis.
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

CORE OILS

Buckeye Products Co., 7022 Vine St., Cincinnati 16, Ohio.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.
Foundry Service Co., Birmingham, Ala.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 330 E. Grand Ave., Chicago 11, Ill.

CORE OVENS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Despatch Oven Co., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit, Mich.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, O.
Girdler Corp., Thermex Division, 224 E. Broadway, Louisville 2, Ky.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Ross Engineering Corp., J. O., 350 Madison Ave., New York 17, N.Y.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.

CORE PASTE

Corn Products Sales Co., 17 Battery Pl., New York 4, N. Y.
Delta Oil Products Co., Milwaukee 9, Wis.
Eastern Clay Products Co., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.

CORE PLATES (Steel, Asbestos)

Black, Sivalls & Bryson, Inc., 720 Delaware, Kansas City 6, Mo.
Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.

CORE ROD STRAIGHTENING and CUTTING MACHINERY

American Wheelabrator & Equipment Co., Mishawaka, Ind.

CORE SAND

Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Weldron Silica Co., 38 So. Dearborn St., Chicago, Ill.

CORE SAND MIXERS

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington St., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa
Freeman Supply Co., 1152 E. Broadway, Toledo 5, O.
Multiplex Machinery Corp., Elmore, Ohio
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

CORE STRIPPERS

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

CORE SPRAYERS

Freeman Supply Co., 1152 Broadway, Toledo 5, O.

CORE TRAYS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

CORE TRUCKS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

CORE VENTS

Demmler, Wm., & Bros., Kewanee, Ill.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, Ohio.
Foundry Service Co., Birmingham Ala.
Smillie, C. M. & Co., 1100 Woodward Heights Blvd., Ferndale, Mich.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

CORE WASH

Asbury Graphite Mills Asbury, N. J.
Bloomsbury Graphite Co., Bloomsbury, N. J.
Carborundum Co., Perth Amboy, N. J.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Corn Products Sales Co., 17 Battery Pl., New York City 4.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co. 4600 E. 71st St., Cleveland 5, O.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Stevens, Frederic B., Inc., Detroit 26, Mich.

CORE WASH (Cont'd.)

United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
United States Graphite Co., Saginaw, Mich.

CORE WIRE CUTTERS

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

CORE WIRE STRAIGHTENERS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

CORE WIRES

Crescent Brass & Pin Co., 5766 Trumbull Ave., Detroit, Mich.

CORES (Annealing)

Pressed Steel Co., Wilkes-Barre, Pa.

COUPLINGS (Air Line)

Cleco Division of Reed Roller Bit Co., Houston, Texas.
C. B. Hunt & Sons Inc., Salem, Ohio
U. S. Air Compressor Co., 5300 Harvard Ave., Cleveland 5, Ohio

COUPLINGS (Flexible)

Ajax Flexible Coupling Co., Westfield, N. Y.

CRANE LUBRICATING SYSTEMS

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.

CRANES (Bucket)

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Electric Tramrail)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.

CRANES (Electric Traveling)

American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div., of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Erie Steel Construction Co., Erie, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Gantry)

Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Modern Equipment Co., Port Washington, Wis.
Wellman Engineering Co., 7000 Central Ave., Cleveland 4, O.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Hand Traveling)

American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.

CRANE (Hand Traveling) (Cont'd.)

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Jib)

American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Modern Equipment Co., Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Monorail)

American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.

CRANES (Self-Propelled)

Hughes-Keenan Co., Mansfield, Ohio
Silent Hoist & Crane Co., 835 63rd St., Brooklyn 20, N. Y.

CRANES (Traction or Tractor)

Silent Hoist & Crane Co., 885 63rd St., Brooklyn 20, N. Y.

CRUCIBLES

American Crucible Co., North Haven, Conn.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Lava Crucible Co., Pittsburgh, Pa.
National Crucible Co. Mermaid Lane and Queen Sts., Philadelphia 18, Pa.
Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.
Vesuvius Crucible Co., Swissvale, Pa.

CRUCIBLE FURNACES

Ajax Electrothermic Corp., Trenton, N. J.
Campbell-Hausfeld Co., Harrison, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.

CRUCIBLE LIFTERS

Modern Equipment Co., Port Washington, Wis.

CRUCIBLE POURING DEVICES

Modern Equipment Co., Port Washington, Wis.

CRUSHERS (Core)

Simplicity Engineering Co., Durand, Mich.

CUPOLAS

Modern Equipment Co., Port Washington, Wis.
Tabor Mfg. Co., 6225 Tacony St. Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA BLOWERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Roots-Connersville Blower Corp., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CHARGING MACHINES

American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CONTROL EQUIPMENT

Edwin S. Carman, Lee Rd. at Mayfield, Cleveland 18, Ohio.
Foxboro Company, Foxboro, Mass.

CUPOLA DUST ARRESTORS

Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.

CUPOLA LININGS

Carborundum Co., Perth Amboy, N. J.
Cleveland Quarries Co., 1740 E. 12th St., Cleveland 14, O.
A. P. Green Fire Brick Co., Mexico, Missouri
Ironton Fire Brick Co., Ironton, O.
Robinson Clay Product Co., 65 West State St., Akron 8, Ohio.
United States Graphite Co., Saginaw, Mich.

CUPOLA PATCHING GUNS

Eastern Clay Products, Inc., Jackson, Ohio.

CUPOLA PRESSURE VALVES

Norwalk Valve Co., S. Norwalk, Conn.

CUPOLA SPARK ARRESTORS

Claude B. Schneible Co., 2827 25th St., Detroit 16, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUTOFF MACHINES (Abrasive)

Fox Grinders Inc., Oliver Bldg., Pittsburgh, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

DARK ROOM ACCESSORIES (X-Ray)

Eastman Kodak Co., Rochester, N. Y.

DARK ROOM PROCESSING (Chemical Tanks, etc.)

Eastman Kodak Co., Rochester, N. Y.

DEGASIFIERS

Metalloy Corp., Rand Tower, Minneapolis 2, Minn.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Niagara Falls Smelting & Refining Div., Continental-United Industries Co., Inc., 2204 Elmwood Ave., Buffalo 17, N. Y.

DEOXIDIZERS

Ajax Metal Co., 48 Richmond St., Philadelphia 23, Pa.
Federated Metals Div. American Smelting and Refining Co., 120 Broadway, New York 5
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Metalloy Corp., Rand Tower, Minneapolis 2, Minn.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

DEOXIDIZERS (Cont'd.)

Niagara Falls Smelting & Refining Div., Continental-United Industries Co., Inc., 2204 Elmwood Ave., Buffalo 17, N. Y.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.

DEOXIDIZERS (Ferrous)

Carborundum Co., Perth Amboy, N. J.

DESULPHURIZERS

Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Hercules Powder Co., Wilmington 99, Del.
Mathieson Chemical Corp., 60 Mathieson Bldg., Baltimore 3, Md.
Modern Equipment Co., Port Washington, Wis.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
Solvay Sales Division Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DIE CASTING MACHINES

Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, O.
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Kux Machine Co., 3930 W. Harrison St., Chicago 24, Ill.
Lester-Phoenix Inc., 2711 Church St., Cleveland 13, Ohio.
Miller-Taylor Tool Co., 5005 Euclid Ave., Cleveland 3, Ohio

DIES

City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Lester-Phoenix Inc., 2711 Church St., Cleveland 13, Ohio.

DIRECT FIRED HEATERS

Dravo Corp., Neville Island, Pittsburgh 25, Pa.

DOWEL PINS

Standard Horse Nail Corp., New Brighton, Pa.

DRILLS (Pneumatic)

Gardner-Denver Co., Quincy, Ill.
Schramm Inc., West Chester, Pa.

DRIVES (Reciprocating)

Ajax Flexible Coupling Co., Westfield, N. Y.

DRUMS (Magnetic)

Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

DUMP HOPPERS

Roura Iron Works, 1405 Woodland Ave., Detroit 11, Mich.

DUMP TRUCKS

Frank G. Hough Co., Libertyville, Ill.
Kwix-Mix Co., Port Washington, Wis.

DUST ARRESTING EQUIPMENT

American Air Filter Co., Inc., 266 Central Ave., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Kirk & Blum Mfg. Co., Cincinnati 25, O.

DUST ARRESTING EQUIPMENT (Cont'd.)

Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
Schmieg Industries, 302 Piquette St., Detroit 2, Mich.
Schneible Co., Claude B., 2827-25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DUST COLLECTORS

Pangborn Corp., Hagerstown, Md.
Schmeig Industries, 302 Piquette, Detroit 2, Mich.
Claude B. Schneible Co., 2827 25th St., Detroit 16, Mich.

DUST COLLECTORS (Shake-out)

Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.

DUST CONTROL (Chemical)

Johnson March Corp., 1724 Chestnut St., Philadelphia, Pa.
Pangborn Corp., Hagerstown, Md.

DUST RECOVERY SYSTEMS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.

ELECTRIC FURNACES (see Furnaces, Electric)

ELECTRODES (Graphite and Amorphous)

International Graphite & Electrode Corp., St. Marys, Pa.
National Carbon Co., Inc., Electrode Sales Div., 30 E. 42nd St., New York 17, N. Y.

ELEVATORS

Standard Conveyor Co., North St. Paul 9, Minn.

ELEVATORS (Bucket)

Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Jeffrey Mfg. Co., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.

ELEVATORS (Material Handling)

Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

ELEVATORS (Pneumatic, Material Handling)

Fuller Co., Catasauqua, Pa.

ENGINEERING SERVICE (Foundry)

Frank D. Campbell, 332 So. Michigan Ave., Chicago, Ill.
Edwin S. Carman, Lee Rd. at Mayfield, Cleveland 18, Ohio
Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.

ENGINEERING SERVICE (Foundry) (Cont'd.)

Herbert F. Miller, 2130 Melrose St., Rockford, Ill.
A. H. Putnam Co., 1319 2nd Ave., Rock Island, Ill.
Westover Engineers, 424 E. Wells St., Milwaukee 2, Wis.
Wickland Co., A. A., 205 W. Wacker Dr., Chicago 6, Ill.

ENGINEERING SERVICE (Permanent Mold)

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio

EXHAUST SYSTEMS

American Air Filter Co., Inc., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
Schmeig Industries, 302 Piquette, Detroit 2, Mich.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

FABRICATORS (Metal)

Roura Iron Works, 1405 Woodland Ave., Detroit 11, Mich.

FACINGS

Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Pacific Graphite Works, 40th & Linden Sts., Oakland 8, Calif.
Stevens Inc., Frederic B., Detroit 16, Mich.
United States Graphite Co., Saginaw, Mich.

FANS (Ventilating, Exhaust, Cooling, etc.)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Joy Mfg. Co., La Del Division, New Philadelphia, Ohio.
Pangborn Corp., Hagerstown, Md.

FEEDERS (Rotary)

Fuller Company, Catasauqua, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Newaygo Engineering Co., Newaygo, Mich.

FEEDERS (Sand)

Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

FERROBORON

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Pittsburgh 19, Pa.

FERROCHROME

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Hickman-Williams & Co., Cleveland, O.
Ohio Ferro-Alloys Corp., Canton 2, O.
Vanadium Corp., of America, 420 Lexington Ave., New York, N. Y.

—When writing advertisers, please mention THE FOUNDRY—

FERROCOLUMBIUM

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

FERROMANGANESE

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, O.
Tennessee Products & Chemical Corp., American National Bank Bldg., Nashville 3, Tenn.

FERROMOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corporation of America, Pittsburgh 19, Pa.

FERROPHOSPHOROUS

Tennessee Products & Chemical Corp., American National Bank Bldg., Nashville 3, Tenn.

FERROSILICON

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Globe Iron Co., Jackson, Ohio
Jackson Iron & Steel Co., Jackson, O.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro-Alloys Corp., Canton 2, O.
Tennessee Products & Chemical Corp., American National Bank Bldg., Nashville 3, Tenn.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FERROTITANIUM

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FERROTUNGSTEN

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Pittsburgh 19, Pa.

FERROVANADIUM

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FILM (X-Ray)

Eastman Kodak Co., Rochester, N. Y.

FILTERS (Air)

American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Dollinger Corp., 36 Centre Park, Rochester 4, N. Y.

FILTERS (Liquid)

Dollinger Corp., 36 Centre Park, Rochester 4, N. Y.

FILTERS and LUBRICATORS (Air Line)

Logan Engineering Co., 4913 Lawrence Ave., Chicago 30, Ill.

FIRE BRICK

Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Carborundum Co., Perth Amboy, N. J.
A. P. Green Fire Brick Co., Mexico, Missouri
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.

FIRE BRICK (Cont'd.)

Illinois Clay Products Co., Joliet, Ill.
Norton Co., Worcester 6, Mass.
Robinson Clay Product Co., 65 West State St., Akron 8, Ohio.
Stevens Inc., Frederic B., Detroit 16, Mich.
Chas. Taylor Sons Co., P.O. Box 58, Annex Sta., Cincinnati 14, Ohio

FIRE CLAY

Eastern Clay Products, Inc., Jackson, O.
A. P. Green Fire Brick Co., Mexico, Missouri
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Robinson Clay Product Co., 65 West State St., Akron 8, Ohio.
Chas. Taylor Sons Co., P.O. Box 58, Annex Sta., Cincinnati 14, Ohio

FIRE SAND

Carborundum Co., Niagara Falls, N. Y.
Cleveland Quarries Co., 1740 E. 12th St., Cleveland 14, O.

FIRESTONE

Cleveland Quarries Co., 1740 E. 12th St., Cleveland 14, O.

FLASK BANDS

Chicago Mfg. & Distributing Co., 1928 W. 16th St., Chicago 9, Ill.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio

FLASK BUSHINGS

Black, Sivalls & Bryson, Inc., 720 Delaware, Kansas City 6, Mo.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Universal Engineering Co., Frankenmuth, Mich.

FLASK PINS

Black, Sivalls & Bryson, Inc., 720 Delaware, Kansas City 6, Mo.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Universal Engineering Co., Frankenmuth, Mich.

FLASKS (Aluminum)

Adams Co., Dubuque, Iowa
Foundry Service Co., Birmingham, Ala.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, O.

FLASKS (Dowmetal)

Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, O.

FLASK FILLERS

Bartlett & Snow, C. C., Co., 6201 Harvard Ave., Cleveland 5, O.

FLASK FILLERS (Cont'd.)

Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Jeffrey Mfg. Co., Columbus 16, O.

FLASKS (Slip)

Adams Co., Dubuque, Iowa.
Fremont Flask Co., Fremont, O.
Freeman Supply Co., Toledo 5, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, O.
Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.

FLASKS (Snap)

Adams Co., Dubuque, Iowa.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio
Stevens, Inc. Frederic B., Detroit 16, Mich.

FLASKS (Steel)

Black, Sivalls & Bryson, Inc., 720 Delaware, Kansas City 6, Mo.
Foundry Service Co., Birmingham, Ala.
Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio

FLASK FITTINGS

Adams Co., Dubuque, Iowa
Black, Sivalls & Bryson, Inc., 720 Delaware, Kansas City 6, Mo.
Buckeye Products Co., 7022 Vine St., Cincinnati 16, Ohio
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio

FLASK LIFT MACHINES

Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

FLASK LUMBER

Dougherty Lumber Co., 4300 E. 66th St., Cleveland 5, O.
Rietz Lumber Co., 1800 N. Central Park Ave., Chicago, Ill.

FLASKS (Wood)

Adams Co., Dubuque, Iowa
Chicago Mfg. & Distributing Co., 1928 W. 16th St., Chicago 9, Ill.

FLOORING (Non-Slip)

Norton Co., Worcester 6, Mass.

FLUXES

American-British Chemical Supplies Inc., 180 Madison Ave., New York 16, N. Y.
Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.
National Pigment Co., East York St., Philadelphia, Pa.

FLUXES (Cont'd.)

Niagara Falls Smelting & Refining Div., Continental-United Industries Co., Inc., 1204 Elmwood Ave., Buffalo 11, N. Y.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
Puro-Seal Co., 2323 West Third, Cleveland 13, Ohio

FLUXES (Soldering, Welding & Tinning)

Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

FOUNDRY CONSULTANTS

Lester B. Knight & Associates Inc., 600 West Jackson Blvd., Chicago 3, Ill.
A. A. Wickland Co., 205 W. Wacker Dr., Chicago 6, Ill.

FOUNDRY ENGINEERS

Lester B. Knight & Associates Inc., 600 West Jackson Blvd., Chicago 3, Ill.
A. A. Wickland Co., 205 W. Wacker Dr., Chicago 6, Ill.

FOUNDRY LAYOUT & METHODS

Frank D. Campbell, 332 So. Michigan Ave., Chicago, Ill.
Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.
A. A. Wickland Co., 205 W. Wacker Dr., Chicago 6, Ill.

FOUNDRY NAILS

Crescent Brass & Pin Co., 5766 Trumbull Ave., Detroit, Mich.
Standard Horse Nail Corp., New Brighton, Pa.

FOUNDRY SHOVELS
(See SHOVELS)

FOUNDRY SUPPLY HOUSES

Buckeye Products Co., 7022 Vine St., Cincinnati 16, Ohio
Combined Supply & Equipment Co., Inc., 215 Chandler St., Buffalo 7, N. Y.
Eastern Clay Products, Inc., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, O.
Stevens, Inc., Frederic B., Detroit 16, Mich.

FURNACES (Aluminum & Magnesium Billets)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio

FURNACES (Aluminum & Magnesium Forgings)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio

FURNACES (Aluminum Melting)

Ajax Engineering Corp., Trenton, N. J.
Campbell-Hausfeld Co., Harrison, O.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.

FURNACES (Aluminum Rivet Heating)

Ajax Electric Co., Inc., Philadelphia 23, Pa.

FURNACES (Annealing)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio
Despatch Oven Co., Minneapolis 14, Minn.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Electric Furnace Co., Salem, Ohio
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lindberg Engineering Co., Fisher Furnace Div. 2450 West Hubbard, Chicago 12, Ill.

FURNACES (Crucible Melting)

Ajax Electrothermic Corp., Trenton, N. J.
Ajax Metal Co., Philadelphia 23, Pa.
Campbell-Hausfeld Co., 300-320 Moore St., Harrison, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

FURNACES (Electric Melting)

Ajax Electric Furnace Corp., 46 Richmond St., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Trenton, N. J.
Ajax Engineering Corp., Trenton, N. J.
Ajax Metal Co., Philadelphia 23, Pa.
American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Greene Electric Furnace Co., 2702 6th So., Seattle 4, Wash.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Gas or Oil Fired)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Campbell-Hausfeld Co., Harrison, O.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Electric Furnace Co., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Company, 750 Prospect Ave., Cleveland 15, Ohio.
Lindberg Engineering Co., Fisher Furnace Div. 2450 West Hubbard, Chicago 12, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

FURNACES (Gray Iron Melting)

American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.

FURNACES (Heat Treating)

Ajax Electric Co., Inc., Philadelphia 23, Pa.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Electric Furnace Co., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.

FURNACES, HEAT TREATING (Electric)

Ajax Electric Co., Inc., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Trenton, N. J.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

FURNACES (Induction Heating)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

FURNACES (Malleable Annealing)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Electric Furnace Co., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
General Electric Co., Schenectady, N. Y.
Lindberg Engineering Co., Fisher Furnace Div. 2450 West Hubbard, Chicago 12, Ill.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Malleable Melting)

American Bridge Co., Pittsburgh 19, Pa.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Nonferrous Melting)

Ajax Electrothermic Corp., Trenton, N. J.
Ajax Engineering Corp., Trenton, N. J.
Ajax Metal Co., Philadelphia 23, Pa.
Campbell-Hausfeld Co., Harrison, O.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Park, Ill.
Swindell-Dressler Corp., Pittsburgh, Pa.

FURNACES (Powdered Coal)

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Steel Melting)

Ajax Electrothermic Corp. Trenton, N. J.
American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.

FURNACE BLOWERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Campbell-Hausfeld Co., Harrison, O.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Joy Mfg. Co., La-Del Division, New Philadelphia, Ohio.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.

FURNACE LININGS

Campbell-Hausfeld Co., Harrison, O.
Carborundum Co., Perth Amboy, N. J.
A. P. Green Fire Brick Co., Mexico, Missouri.
Ironton Fire Brick Co., Ironton, O.
Lindberg Engineering Co., Fisher furnace Div., 2450 West Hubbard, Chicago 12, Ill.
National Carbon Co. Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.
United States Graphite Co., Saginaw, Mich.

GAGGERS

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

GAS (Oxygen, Acetylene, Industrial)

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

GAS BURNERS

Fisher Furnace Co., 2543 West Hubbard St., Chicago 12, Ill.

GENERATORS (Acetylene)

Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

GLOVES (Industrial, Safety)

American Optical Co., Southbridge, Mass.
Richmond Glove Corp., Richmond, Ind.

GOGGLES and EYE PROTECTORS

American Optical Co., Southbridge, Mass.
Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.
Wilson Products Inc., Reading, Pa.

GRAPHITE

Asbury Graphite Mills Asbury, N. J.
Acheson Colloids Corp., Port Huron Mich.
Bloomsbury Graphite Co., Bloomsbury, N. J.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.
International Graphite & Electrode Corp., St. Marys, Pa.
National Carbon Co. Inc., Carbon Products Div., 30 E. 42nd St., New York 17.
United States Graphite Co., Saginaw, Mich.

GRINDERS (Electric Portable)

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Rotor Tool Co., 17325 Euclid Ave., Cleveland 12, Ohio.
Skilsaw, Inc., 5000 N. Elston, Chicago 30, Ill.
U. S. Electrical Tool Co., Cincinnati 4, O.

GRINDERS (Pneumatic Portable)

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Tex.
Master Pneumatic Tool Co., Inc., Orwell, Ohio.
Rotor Tool Co., 17325 Euclid Ave., Cleveland 12, Ohio.

GRINDERS (Surface, Bench, Disc., Floor)

Fox Grinders, Inc., Oliver Bldg., Pittsburgh 22, Pa.
Skilsaw, Inc., 5000 N. Elston, Chicago 30, Ill.
Standard Electrical Tool Co., 2488 Riverside Ave., Cincinnati 4, Ohio.
U. S. Electrical Tool Co., 2488 River Rd. Cincinnati 4, O.
Vonnegut Moulder Corp., 1815 Madison Ave., Indianapolis 2, Ind.

GRINDERS (Swing Frame)

Fox Grinders, Inc., Oliver Bldg., Pittsburgh 22, Pa.
Vonnegut Moulder Corp., 1815 Madison Ave., Indianapolis 2, Ind.

GRINDING WHEELS—See ABRASIVE WHEELS

GRINDING WHEEL DRESSERS

Carborundum Co., Niagara Falls, N. Y.
Desmond-Stephan Mfg. Co., Urbana, O.

GRINDSTONES

Bay State Abrasive Products Co., Westboro, Mass.
Sterling Grinding Wheel Div., Cleveland Quarries Co., 1740 E. 12th St., Cleveland, O.

GRIT (Abrasive)

Alloy Metal Abrasive Co., Ann Arbor, Mich.
American Steel Abrasives Co., Galion, O.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Carborundum Co., Niagara Falls, N. Y.
Clayton Sherman Abrasives Co., 3896 Lonyo Rd., Detroit 10, Mich.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Globe Steel Abrasive Co., Mansfield, Ohio.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Pangborn Corp., Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.

-HAMMERS (Chipping)

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.
Dayton Pneumatic Tool Co., Dayton 1, Ohio.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Master Pneumatic Tool Co., Inc., Orwell, Ohio.
Schramm Inc., West Chester, Pa.

HARDNESS TESTING EQUIPMENT

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Steel City Testing Machines Inc., 8843 Livernois Ave., Detroit 4, Mich.

—When writing advertisers, please mention THE FOUNDRY—

HEAT CONTROL AND RECORDING DEVICES (Cont'd.)

Foxboro Company, Foxboro, Mass.
Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.

HEATERS (Gas, Oil, Electric)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.
Ross Engineering Corp., J. O., 350 Madison Ave., New York 17, N.Y.
Surface Combustion Corp., Toledo 7, Ohio

HEATERS (High Frequency Electric)

Ajax Electrothermic Corp., Trenton, N. J.

HEATERS (Indirect Fired)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio
Surface Combustion Corp., Toledo 7, Ohio

HEATERS (Space, Unit, Direct Fired)

Dravo Corp., Neville Island, Pittsburgh 25, Pa.
Surface Combustion Corp., Toledo 7, Ohio

HEATERS (Space, Unit, Oven, Water)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Surface Combustion Corp., Toledo 7, Ohio

HELMETS (Blasting)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
American Optical Co., Southbridge, Mass.
Mine Safety Appliance Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.

HELMETS (Welding)

American Optical Co., Southbridge, Mass.

HOISTS (Air)

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.

HOISTS (Chain)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
David Round & Sons, Broadway & Henry Sts., Cleveland 5, Ohio

HOISTS (Electric)

Chisholm-Moore Hoist Corp and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
David Round & Sons, Broadway & Henry Sts., Cleveland 5, Ohio
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

HOISTS (Hand)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio
David Round & Sons, Broadway & Henry Sts., Cleveland 5, Ohio

HOPPERS (Sand)

Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.

HOSE (Air, Blasting, Water, Gas)

Gardner-Denver Co., Quincy, Ill.
Hewitt Rubber Div. Hewitt-Robins Div., Inc., 240 Kinsington Ave., Buffalo 5, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Pangborn Corp., Hagerstown, Md.
Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.
Schramm Inc., West Chester, Pa.

HYDRAULIC CLEANING EQUIPMENT

Hydro-Blast Corp., 2050 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
N. Ransohoff, Inc., 16 E. 42nd St., Cincinnati 16, Ohio.

HYDRO FINISHING EQUIPMENT

Pangborn Corp., Hagerstown, Md.

ILLUMINATORS (X-Ray Film)

Eastman Kodak Co., Rochester, N. Y.

IMPREGNATING SYSTEMS

Empire Varnish Co., 2636 E. 78th St., Cleveland 4, O.
Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.

INDUSTRIAL ENGINEERING SERVICE

Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.
Westover Engineers, 424 E. Wells St., Milwaukee 2, Wis.

INGOT MOLDS

Acme Foundry Co., Detroit 16, Mich.

INGOTS (Nonferrous)

Ajax Metal Co., Philadelphia 23, Pa.
American Smelting and Refining Co., 120 Broadway, New York 5
Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.
Cleveland Electro Metals Co., W. 38th St. & NP R.R., Cleveland 13, O.
Federated Metals Div., American Smelting and Ref. Co., New York 5
International Nickel Co., Inc., 67 Wall St., New York City 5
Northwestern Iron & Metal Co., 900 "T" Street, Lincoln, Nebraska

INGOTS (Nonferrous) (Cont'd.)

Sonken-Galamba Corp., Kansas City 18, Kansas
Western Metals Co., 3201 So. Kedzie Ave., Chicago 23, Ill.

INJECTION MOLDING MACHINES

Lester-Phoenix Inc., 2711 Church St., Cleveland 13, Ohio
W. McGeough, Milwaukee 7, Wis.

INOCULANTS

Carborundum Co., Perth Amboy, N. J.

IRON CEMENT

Smooth-On Mfg. Co., 570 Communipaw Ave., Jersey City 4, N. J.

IRON ORE

Pickands, Mather & Co., Cleveland 14, O.

IRON OXIDES

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.

JACKETS (Mold)

Adams Co., Dubuque, Iowa
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio
Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.

LABORATORY EQUIPMENT (Chemical)

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Laboratory Equipment Corp., St. Joseph, Mich.

LABORATORY EQUIPMENT (Physical)

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Laboratory Equipment Corp., St. Joseph, Mich.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Norton Co., Worcester 6, Mass.

LADLES

Foundry Service Co., Birmingham, Ala.
Industrial Equipment Co., Minster, O.
Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.
Modern Equipment Co., Port Washington, Wis.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

LADLE LININGS

A. P. Green Fire Brick Co., Mexico, Missouri
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Ironton Fire Brick Co., Ironton, Ohio

LATHE CENTERS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

LEAD

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5.

LINSEED OIL

Hercules Powder Co., Wilmington 99, Del.

LOADERS

Clearfield Machine Co., Clearfield, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

LOADERS (Tractor-Mounted)

Frank G. Hough Co., Libertyville, Ill.

LUBRICANTS (Industrial)

Acheson Colloids Corp., Port Huron, Mich.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill. New York 26, N. Y.
United States Graphite Co., Saginaw, Mich.

LUMBER (All kinds)

Dougherty Lumber Co., 4300 East 68th St., Cleveland 5, Ohio.

MACHINE KEYS

Standard Horse Nail Corp., New Brighton, Pa.

MAGNESIUM (Ingots)

Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.

MAGNET CONTROLLERS

Ohio Electric Mfg. Co., 5906 Maurice Ave., Cleveland, Ohio

MAGNETS

Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
Ohio Electric Mfg. Co., 5906 Maurice Ave., Cleveland, Ohio.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

MANGANESE (Briquets)

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

MATCHPLATES

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.
Central Pattern Co. Quincy, Ill.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio
Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland 3, O.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.
Arthur E. Will, 643 West 11th St., Erie, Pa.

MATERIALS HANDLING EQUIPT.

Frank G. Hough Co., Libertyville, Ill.
Hughes-Keenan Co., Mansfield, Ohio.

MATERIALS HANDLING DESIGN

Frank D. Campbell, 332 So. Michigan Ave., Chicago, Ill.

MATERIALS HANDLING (Hoists)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.

MECHANICAL ENGINEERS

Frank D. Campbell, 332 So. Michigan Ave., Chicago, Ill.
Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.

MELTING POTS

Acme Foundry Co., Detroit 16, Mich.
American Tank & Fabricating Co., 2284 Scranton Rd., Cleveland 13, Ohio

METAL CLEANING EQUIPMENT

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
N. Ransohoff, Inc., 16 E. 72nd St., Cincinnati 16, Ohio.

METALLIC SPRAYING EQUIPMENT

Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.

METALLIZING PROCESS

Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.

METALLOGRAPHIC EQUIPMENT

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.

METALLURGISTS

Crobaugh Co., Frank L., 1426 West Third St., Cleveland 13, Ohio.

METERS (Gas, Air, Water)

Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.

MIXERS (Core Wash)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Multiplex Machinery Corp., Elmore, Ohio

MIXERS (Sand and Clay)

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington St., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Co., Waterloo, Iowa.
Fordath Engineering Co. Ltd., West Bromwich, Birmingham, England.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Multiplex Machinery Corp., Elmore, Ohio
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.
Sather Mfg. Co., Everett, Wash.

MODELS (Wood)

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

MOLD CONVEYORS

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.

MOLD CONVEYORS (Cont'd)

MOLD CONVEYOR (Cont'd.)

National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.

MOLD DRYERS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

MOLD OVENS and DRYERS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, O.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Ross Engineering Corp., J. O., 350 Madison Ave., New York 17, N. Y.

MOLD WASH

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
United States Graphite Co., Saginaw, Mich.

MOLDERS TOOLS

Monk Tool Co., Union Street, Geneva, Ill.

MOLDING MACHINES

Adams Co., Dubuque, Iowa.
Beardsley & Piper Co., The 2424 N. Cicero, Chicago 39, Ill.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport, Machine & Foundry Co., Davenport, Iowa.
Foundry Service Co., Birmingham, Ala.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Moline Iron Works, Moline, Ill.
Nichols, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Stone-Wallwork Ltd., 252 Victoria St., London, England
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Jolt)

Adams Co., Dubuque, Iowa.
Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Nichols, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Stone-Wallwork Ltd., 252 Victoria St., London, England
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Rollover)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Squeeze)

Adams Co., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Moline Iron Works, Moline, Ill.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Stone-Wallwork Ltd., 252 Victoria St., London, England
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING SANDS

Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

MOLYBDENUM

Molybdenum Corporation of America, Pittsburgh 19, Pa.

MONOGRAMS & TRADEMARKS

H. P. Maughlin Co., 953 Ingleside Ave., Columbus, Ohio

MONORAIL SYSTEMS

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Modern Equipment Co., Port Washington, Wis.

MOTORS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Ohio Electric Mfg. Co., 5906 Maurice Ave., Cleveland, Ohio.

NAILS (Chill)

Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland 5, O.
Crescent Brass & Pin Co., 5766 Trumbull Ave., Detroit, Mich.
Republic Steel Corp, 3100 E. 45th St., Cleveland 4, Ohio.
Standard Horse Nail Corp., New Brighton, Pa.

NICKEL

International Nickel Co., Inc., 67 Wall St., New York City 5.

NITROGEN

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

NOZZLES (Blasting)

Alloy Metal Abrasives Co., 311 W. Huron St., Ann Arbor, Mich.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Davenport Machine & Foundry Co., Davenport, Iowa.
Federal Foundry Supply Co., 4600 E. 7st St., Cleveland 5, O.
Norton Co., Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
W. W. Sly, Mfg. Co., 4753 Train Ave., Cleveland 2, O.

OIL BURNERS

Hauck Manufacturing Co., 106 Tenth St., Brooklyn 15, N. Y.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

OVENS (Annealing and Heat Treating)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Electric Furnace Co., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Lindberg Engineering Co., Fisher Furnaces Div., 2450 West Hubbard, Chicago 12, Ill.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

OVENS (Core) (See CORE OVENS)

OVENS (Enameling, Japanning)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit, Mich.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.

OVENS (Mold)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit, Mich.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.

OXYGEN

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

PARTING COMPOUNDS

Buckeye Products Co., 7022 Vine St., Cincinnati 16, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Frederic B. Stevens, Inc., Detroit 16, Mich.

—When writing advertisers, please mention THE FOUNDRY—

PARTING COMPOUNDS (Cont'd.)

E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.

PATTERN COATINGS

American Lacquer Solvents Co., Phoenixville, Pa.

PATTERN COMPOUND

Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.

PATTERN LETTERS

Freeman Supply Co., Toledo 5, O.
H. P. Maughlin Co., 953 Ingleside Ave., Columbus, Ohio

PATTERN LUMBER

Dougherty Lumber Co., Cleveland 5, O.
Freeman Supply Co., Toledo 5, O.
Rietz Lumber Co., 1800 N. Central Park Ave., Chicago, Ill.

PATTERN MATERIAL (Plastic)

G. G. Schroeder & Co., 1416 South Penn Square, Philadelphia 2, Pa.

PATTERN PLATES

Accurate Match Plate Co., 1847 W. Caroll St., Chicago, Ill.
Buffalo Pattern Works, 830 Hertel Ave., Buffalo, N. Y.
Central Pattern Co., Quincy, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Foundry Service Co., Birmingham, Ala.
Freeman Supply Co., Toledo 5, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland 3.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.
Arthur E. Will, 643 West 11th St., Erie, Pa.

PATTERN PLATE STOCK

Freeman Supply Co., 1152 Broadway, Toledo 5, O.

PATTERN SHOP EQUIPMENT

Freeman Supply Co., 1152 East Broadway, Toledo 5, Ohio.
Oliver Machinery Company, Grand Rapids 2, Mich.
Skilsaw, Inc., 5000 N. Elston, Chicago 30, Ill.

PATTERN SUPPLY HOUSES

Freeman Suppy Co., 1152 East Broadway, Toledo 5, Ohio.

PATTERNS

Industrial Pattern Works, 2621 Belmont Ave., Chicago 18, Ill.

PATTERNS (PLASTIC)

Central Pattern Co., Quincy, Ill.
Plastic Corp. of Chicago, 2444 So. Central Ave., Cicero 50, Ill.

PATTERNS (Wood, Metal)

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.
Buffalo Pattern Works, 830 Hertel Ave., Buffalo, N. Y.
Central Pattern Co., Quincy, Ill.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Wellman Bronze & Aluminum Co., 2525 E. 93rd St., Cleveland 4, O.
Arthur E. Will, 643 West 11th St., Erie, Pa.

PERMANENT MOLD COATINGS

Acheson Colloids Corp., Port Huron, Mich.

PERMANENT MOLDS

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

PHOTOGRAPHIC EQUIPMENT

Eastman Kodak Co., Rochester, N. Y.

PHOTOGRAPHY (Industrial)

Eastman Kodak Co., Rochester, N. Y.

PIG IRON

Globe Iron Co., Jackson, Ohio.
Jackson Iron & Steel Co., Jackson, Ohio.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Pickands, Mather & Co., Cleveland 14, O.
Republic Steel Corp., 3100 E. 45th St., Cleveland 4, Ohio.
Tennessee Products & Chemical Corp., American National Bank Bldg., Nashville 3, Tenn.
Woodward Iron Co., Woodward, Ala.

PIG IRON (Silvery)

Globe Iron Co., Jackson, Ohio.
Jackson Iron & Steel Co., Jackson, O.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.

PINS (Flask)

Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Shanafelt Mfg. Co., 3623 Winfield Way, N.E., Canton 5, Ohio.
Sterling Wheelbarow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.
Universal Engineering Co., Franknenmuth, Mich.

PISTON RINGS (for Molding Machines, Compressors, etc.)

Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.

PLANT ENGINEERING SERVICE

Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.

PLANT ENGINEERING SERVICE (Cont'd.)

Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.

PLATES (Bottom)

Adams Co., Dubuque, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

PLATES (Core Drying)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Johns-Manville, 22 East 40th St., New York City 16.

PLATING TEMPERATURE CONTROLS

Foxboro Company, Foxboro, Mass.

PLUMBAGO

Bloomsbury Graphite Co., Bloomsbury, N. J.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.
Frederic B. Stevens, Inc., Detroit 16, Mich.
United States Graphite Co., Saginaw, Mich.

PNEUMATIC TOOLS

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.
Dayton Pneumatic Tool Co., Dayton 1, Ohio.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Master Pneumatic Tool Co., Inc., Orwell, Ohio.
Rotor Tool Co., 17325 Euclid Ave., Cleveland 12, Ohio.
Schramm Inc., West Chester, Pa.

POURING DEVICES

Industrial Equipment Co., Minster, Ohio.
Modern Equipment Co., Port Washington, Wis.
Whiting Corp., 15807 Lathrop Ave., Harvey, Ill.

PRESSER BOARDS

Adams Co., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

PRESSES (Hydraulic)

Hydraulic Press Mfg. Co., Mount Gilead, Ohio.

PRESSURE CASTING SEALER

Empire Varnish Co., 2636 E. 76th St., Cleveland 4, O.

PRESSURE RECORDERS

Foxboro Company, Foxboro, Mass.

PULLEYS (Magnetic)

Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

PUMPS

Construction Machinery Co., Waterloo, Iowa.
Gardner-Denver Co., Quincy, Ill.

PUMPS (Dry, Vacuum)

Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
Fuller Company, Catasauqua, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

PURIFIERS

Cleveland Flux Co., 1026 Main St., Cleveland 13, O.

PUSH-OFF MACHINES

Beardsley & Piper Co., 2424 N. Cicero, Chicago 39, Ill.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.

PUTTY (Foundry)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

PYROMETERS

Foxboro Company, Foxboro, Mass.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Pyrometer Instrument Co., Bergenfield, N. J.
Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.

PYROMETERS (Immersion)

Pyrometer Instrument Co., Bergenfield, N. J.

PYROMETERS (Optical)

Pyrometer Instrument Co., Bergenfield, N. J.

RACKS (Core Oven)

Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

RADIOGRAPHY (Industrial)

Eastman Kodak Co., Rochester, N. Y.
Eldorado Mining & Refining Ltd., P.O. Box 379, Ottawa, Ont.
Radium Chemical Co., Inc., 570 Lexington Ave., New York 22, N. Y.

RADIUM

Eldorado Mining & Refining Ltd., P.O. Box 379, Ottawa, Ont.
Radium Chemical Co., Inc., 570 Lexington Ave., New York 22, N. Y.

REFRACTORIES

Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Carborundum Co., Niagara Falls, N. Y.
Carborundum Co., Perth Amboy, N. J.
Cleveland Quarries Co., 1740 E. 12th St., Cleveland 14, O.
Eastern Clay Products, Inc. Jackson, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
A. P. Green Fire Brick Co., Mexico, Missouri
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Ironton Fire Brick Co., Ironton, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.

—When writing advertisers, please mention THE FOUNDRY—

REFRACTORIES (Cont'd.)

Norton Co., Worcester 6, Mass.
Robinson Clay Product Co., 65 West State St., Akron 8, Ohio.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Chas. Taylor Sons Co., P.O. Box 58, Annex Sta., Cincinnati 14, Ohio
United States Graphite Co., Saginaw, Mich.

RESPIRATORS

Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.
Wilson Products Inc., Reading, Pa.

RIDDLES

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.

RIDDLES (Electric)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Great Western Mfg. Co., Leavenworth, Kans.

RIDDLES (Hand)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

ROD DIP

Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.

ROD STRAIGHTENERS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

RODS (Steel)

Republic Steel Corp., 3100 E. 45th St., Cleveland 4, Ohio

ROLLER-HEARTH FURNACES (Electric Annealing)

General Electric Co., Schenectady, N Y.

RUBBER LINING MATERIAL (Abrasive Resisting)

Pangborn Corp., Hagerstown, Md.

SAFETY CLOTHING

American Optical Co., Southbridge, Mass.
Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.
Pangborn Corp., Hagerstown, Md.

SALT and SALT TABLETS

Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

SAND ARRESTER TUBES

Martin Engineering Co., Kewanee, Ill.

SAND (Core, Molding, Blasting)

American Silica Sand Co., Ottawa, Ill.
Carpenter Brothers, Inc., 606 West Wisconsin, Milwaukee 3, Wis.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.

SAND (Core, Molding, Blasting) (Cont'd.)

Pangborn Corp., Hagerstown, Md.
Producers Core Sand Corp., Michigan City, Ind.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

SAND BLAST BARRELS

American Wheelabrator & Equipment Co., 505 S. Brykit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill
Pangborn Corp., Hagerstown, Md.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Sly Mfg. Co., W. W. 4753 Train Ave., Cleveland 2, O.

SAND BLAST CABINETS

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

SAND BLAST EQUIPMENT

American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST NOZZLES

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Norton Company, Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST ROOMS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W. 4753 Train Ave., Cleveland 2, O.

SAND BLAST TABLES

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST CONDITIONERS

Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.

SAND CONDITIONING (Chemical)

Johnson March Corp., 1724 Chestnut St., Philadelphia, Pa.

SAND CONTROL & TESTING EQUIPMENT

Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND CONVEYING and HANDLING EQUIPMENT

American Air Filter Co., Louisville 8, Ky.
Ajax Flexible Coupling Co., Westfield, N. Y.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Clearfield Machine Co., Clearfield, Pa.

SAND CONVEYING and HANDLING EQUIPMENT (Cont'd)

Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio
Frank G. Hough Co., Libertyville, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Penn Iron Works, Reading, Pa.
Royer Foundry & Machine Co., Kingston, Pa.

SAND CONVEYING and HANDLING EQUIPMENT (Pneumatic)

Fuller Company, Catasauqua, Pa.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.

SAND COOLING SYSTEMS

Newaygo Engineering Co., Newaygo, Mich.

SAND DRYERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, Ohio.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Nichols Engineering & Research Corp., 70 Pine St., New York 5, N. Y.

SANDERS (Pneumatic)

Cleco Division of Reed Roller Bit Co., Houston, Texas.

SANDERS (Tapered-Spindles)

Wellman Products Co., 1444 E. 49th St., Cleveland 3, O.

SANDING MACHINERY (Disc, Spindle, Belt, etc.)

Freeman Supply Co., 1152 E. Broadway, Toledo 5, Ohio.
Oliver Machinery Company, Grand Rapids 2, Mich.

SAND MEASURING and WEIGHING DEVICES

Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND MIXERS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Beardsley & Piper Co., The, 2424 N. Cicero, Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Corp., Waterloo, Iowa.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, Ohio.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Multiplex Machinery Corp., Elmore, Ohio
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

SAND PREPARATION EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Ajax Flexible Coupling Co., Westfield, N. Y.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.

SAND PREPARATION EQUIPMENT (Cont'd.)

Beardsley & Piper Co., The, 2424 N. Cicero, Chicago 39, Ill.
Clearfield Machine Co., Clearfield, Pa.
Fordath Engineering Co. Ltd., West Bromwich, Birmingham, England.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Moulders Friend, Dallas City, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Royer Foundry & Machine Co., Kingston, Pa.
Sather Mfg. Co., Everett, Wash.
Simplicity Engineering Co., Durand, Mich.

SAND RAMMERS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.
Dayton Pneumatic Tool Co., Dayton 1, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Mastern Pneumatic Tool Co., Inc., Orwell, Ohio.
Rotor Tool Co., 17325 Euclid Ave., Cleveland 12, Ohio.

SAND RECLAIMERS

Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Nichols Engineering & Research Corp., 70 Pine St., New York 5, N. Y.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

SAND SIFTING and SCREENING MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Air Filter Co., Louisville 8, Ky.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Co., The, 2424 N. Cicero, Chicago 39, Ill.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Great Western Mfg. Co., Leavenworth, Kansas.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.
Pangborn Corp., Hagerstown, Md.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

SAND STORAGE BINS & GATES

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Co., The, 242 No. Cicero, Chicago 39, Ill.
Jeffrey Mfg. Co., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Neff & Fry Co., Camden, O.

SANDING MACHINERY (Electric Portable)

Skilsaw, Inc., 5000 N. Elston, Chicago 30, Ill.

—When writing advertisers, please mention THE FOUNDRY—

SAWS (Band, Metal, Wood)

Atlantic Saw Mfg. Co., New Haven, Conn.
Oliver Machinery Company, Grand Rapids 2, Mich.

SAWS (Cold Metal)

Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

SAWS (Electric Portable)

Skilsaw, Inc., 5000 N. Elston, Chicago 30, Ill.

SCALING HAMMERS

Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Rotor Tool Co., 17325 Euclid Ave., Cleveland 12, Ohio.
Schramm, Inc., West Chester, Pa.

SCREENS (Shake-Out)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Co., 2424 N. Cicero, Chicago 39, Ill.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Simplicity Engineering Co., Durand, Mich.

SCREENS (Vibrating)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Ajax Flexible Coupling Co., Westfield, N. Y.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Simplicity Engineering Co., Durand, Mich.

SEA COAL

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.

SEPARATORS (Abrasive)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Air, Moisture, Oil)

American Air Filter Co., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Dollinger Corp., 36 Centre Park, Rochester 4, N. Y.
Logan Engineering Co., 4913 Lawrence Ave., Chicago 30, Ill.
Jas. A. Murphy & Co., Hamilton, O.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Magnetic)

Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

SHAKE-OUT MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Air Filter Co., Louisville 8, Ky.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

SHAKE-OUT MACHINERY (Cont'd.)

Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Productive Equipment Co., 2926 W. Lake St., Chicago 12, Ill.
Robins Conveyors, Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.

SHOT AND GRIT

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.
Carpenter Brothers, Inc., 600 West Wisconsin, Milwaukee 3, Wis.
Clayton Sherman Abrasives Co., 3896 Lonyo Rd., Detroit 10, Mich.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Foundry Service Co., Birmingham, Ala.
Globe Steel Abrasive Co., Mansfield, O.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Pangborn Corp., Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Steel Shot & Grit Co., Inc., 39 Warren Ave., Boston, Mass.

SHOT (Peening)

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
American Steel Abrasive Co., Galion, O.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Globe Steel Abrasive Co., Mansfield, Ohio.
Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Pangborn Corp., Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
Steel Shot & Grit Co., Inc., 39 Warren Ave., Boston, Mass.

SHOVELS

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.

SHOVELS (Power)

Frank G. Hough Co., Libertyville, Ill.

SILICA FLOUR

Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, O.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

SILICOMANGANESE

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

SILICON (Briquets)

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, Ohio

SILICON CARBIDE (Briquets)

Carborundum Co., Perth Amboy, N. J.

SILVERY PIG IRON see Pig Iron (Silvery)

SKIMMER BARS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

SKIMMERS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.

SKIP HOISTS

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Gardner-Denver Co., Quincy, Ill.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

SLIP FLASKS

Adams Co., Dubuque, Iowa.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

SLINGS (Chain)

Jeffrey Mfg. Co., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
S. G. Taylor Chain Co., Hammond, Ind.

SLIP JACKETS

Adams Co., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

SMELTERS & REFINERS

Federated Metals Div. American Smelting and Refining Co., 120 Broadway, New York 5.
Niagara Falls Smelting & Refining Div., Continental-United Industries Co., Inc., 2204 Elmwood Ave., Buffalo 17, N. Y.

SNAGGING BELTS

Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

SNAGGING WHEELS—See ABRASIVE WHEELS

SNAP FLASKS

Adams Co., Dubuque, Iowa.
Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

SODA ASH

Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.
Hercules Powder Co., Wilmington 99, Del.
Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.
Solvay Sales Division Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

SOLDER

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5.

SPACE HEATERS

Dravo Corp., Neville Island, Pittsburgh 25, Pa.

SPECIAL FOUNDRY ALLOYS

Niagara Falls Smelting & Refining Div. Continental-United Industries Co., Inc., 2204 Elmwood Ave., Buffalo 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

SPOT WELDING APPARATUS

Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.

SPRAY GUNS

Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.
Murphy & Co., Jas. A., Hamilton, O.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.

SPRUE CUTTERS

Adams Co., Dubuque, Iowa
Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee, Wis.

STEEL (Structural)

American Bridge Co., Pittsburgh 19, Pa.

STRAIGHTENING MACHINES (Malleable Iron)

Hydraulic Press Mfg. Co., Mount Gilead, Ohio

STRIPPING MACHINES

Adams Co., Dubuque, Iowa
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3228 W. Pierce St., Milwaukee, Wis.

SURFACE TREATMENT METALS

Pangborn Corp., Hagerstown, Md.
N. Ransohoff, Inc., 16 E. 72nd St., Cincinnati 16, Ohio

TAPER PINS

Standard Horse Nail Corp., New Brighton, Pa.

TEMPERATURE CONTROLLERS

Foxboro Company, Foxboro, Mass.
Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.

TESTING EQUIPMENT

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.
Steel City Testing Machines Inc., 8843 Livernois Ave., Detroit 4, Mich.

TESTING LABORATORIES

Harry Dietert Co., 9330A Rosslawn Ave., Detroit 4, Mich.

TESTING MACHINES (Tensile)

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.
Steel City Testing Machines Inc., 8843 Livernois Ave., Detroit 4, Mich.

THERMOCOUPLES

Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Pyrometer Instrument Co., Bergenfield, N. J.
Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.

—When writing advertisers, please mention THE FOUNDRY—

TIMERS (Electric)

Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

TIN

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N.Y.

TONGS

Industrial Equipment Co., Minster, O.

TOOLS (Electric Portable)

Skilsaw, Inc., 5000 N. Elston, Chicago 30, Ill.

TOOLS (Pneumatic Portable)

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Dayton Pneumatic Tool Co., Dayton 1, O.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Schramm Inc., West Chester, Pa.

TORCHES and BURNERS (Acetylene, gas, oil)

Linde Air Products Co., 30 E. 42nd St., New York 17.

TOTE BOXES (see "BOXES-TOTE")

TRACTOR (Gas Powered)

Butler Bin Co., Waukesha, Wis.
Frank G. Hough Co., Libertyville, Ill.

TRADE ASSOCIATIONS

Crucible Manufacturers Association, 90 West St., New York 6, N.Y.

TRAMRAIL SYSTEMS

American MonoRail Co. 13104 Athens Ave., Cleveland 7, Ohio.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Modern Equipment Co., Port Washington, Wis.

TRAPS

Jas. A. Murphy & Co., Hamilton, Ohio.

TROLLEYS

Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Modern Equipment Co., Port Washington, Wis.

TRUCK CRANES

Hughes-Keenan Co., Mansfield, Ohio.
Silent Hoist & Crane Co., 885 63rd St., Brooklyn 20, N. Y.

TRUCK WHEELS

Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

TRUCKS (Casting)

Kwix-Mix Co., Port Washington, Wis.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

TRUCKS (Core Oven)

Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

TRUCKS (Power Lift)

Butler Bin Co., Waukesha, Wis.
Frank G. Hough Co., Libertyville, Ill.

TUBES (Annealing)

Pressed Steel Co. Wilkes-Barre, Pa.

TUMBLING BARRELS

N. Ransohoff, Inc., 16 E. 72nd St., Cincinnati 16, Ohio.
Royersford Foundry & Machine Co., Royersford, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

TURNTABLES

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Modern Equipment Co., Port Washington, Wis.
Newaygo Engineering Co., Newaygo, Mich.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

UNIT HEATERS

Dravo Corp., Neville Island, Pittsburgh 25, Pa.

VALVES (Air, Water, Steam)

Air-Way Pump & Equipment Co., 1050 N. Kilbourn, Chicago, Ill.

VALVES (Blow-off and Cut-off)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
C. B. Hunt & Sons Inc., Salem, Ohio
Wm. H. Nichols Co., Richmond Mill, Long Island 18, N. Y.

VALVES (Cupola Pressure)

Norwalk Valve Co., S. Norwalk, Conn.

VALVES (Oxygen, Acetylene)

Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

VENTILATORS (Roof)

Swartwout Co., 18511 Euclid Ave., Cleveland 15, Ohio.

VENTILATING SYSTEMS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Joy Mfg. Co., La-Del Division, New Philadelphia, Ohio.
Pangborn Corp., Hagerstown, Md.
Ross Engineering Corp., J. O., 350 Madison Ave., New York 17, N.Y.

VENTILATING SYSTEMS (Cont'd.)

Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.
Westinghouse Electric Corp., B. F. Sturtevant Div., 40 Wall St., New York 4, N. Y.

VENTS (Core Box)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Demmler & Bros., Wm., Kewanee, Ill.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.

VIBRATORS

Adams Co., Dubuque, Iowa.
Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave. W., Cleveland 13, Ohio
Davenport Machine & Foundry Co., Davenport, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Martin Engineering Co., Kewanee, Ill.
Milwaukee Foundry Equipment Co. 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Nichols Co., Wm., H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

VIBRATORS (Core Bench)

Cleveland Vibrator Co., 2828 Clinton Ave. W., Cleveland 13, Ohio
Martin Engineering Co., Kewanee, Ill.

VISES (Air Operated)

Van Products Co., Erie, Pa.

WASH ROOM EQUIPMENT

Bradley Washfountain Co., Box 732, Milwaukee 1, Wis.

WAX (Core, Vent, Pattern)

United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

WEDGES (Foundry)

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WELDING GAS

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING APPARATUS (Electric Arc)

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.
Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.

WELDING and CUTTING APPARATUS and SUPPLIES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING ELECTRODES (Carbon)

National Carbon Co., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.
Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.

WHEELBARROWS

Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS, ABRASIVE (Cut-off)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Norton Company, Worcester 6, Mass.
Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.

WIRE BENDERS

Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.

WIRE BRUSHES

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.

WIRE CUTTERS

Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.

WIRE NAILS

Republic Steel Corp., 3100 E. 45th St., Cleveland 4, Ohio.

WOODWORKING MACHINERY

Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Oliver Machinery Co., Grand Rapids 2, Mich.

X-RAY EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

X-RAY FILMS

Eastman Kodak Co., Rochester, N. Y

ZINC

Federated Metals Div. American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

—When writing advertisers, please mention THE FOUNDRY—

Classified Advertising

Help Wanted

FOREMAN

For Molding Department malleable iron foundry located in Middle West. State experience and qualifications and furnish references. Address: Box 695, The FOUNDRY, Cleveland 13, Ohio.

BRASS FOUNDRYMAN

Energetic brass foundryman to break in behind superintendent in a modern production foundry. Must be a good molder and able to handle men. Give references and full information and wages expected in first letter. Address: Box 764, The FOUNDRY, Cleveland 13, Ohio.

PATTERN MAKER

Experienced on small ornamental brass gated (no plates) castings. Excellent opportunity. Your reply held confidential. State full details in first letter. Address: CHAUTAUQUA HARDWARE CORPORATION, BOX 938, JAMESTOWN, NEW YORK.

FOUNDRY SUPERINTENDENT

Gray iron foundry. Bench, squeezer, rollover, floor. Fractional to 1000 pound quality castings, 500 tons per month. Eastern Pennsylvania. Replies held confidential. Address: Box 792, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

One who has knowledge and experience in cupola, gating and rising in gray iron foundry producing gray iron, semi steel, alloy and ductile cast iron with some metallurgical experience. Address: Box 766, The FOUNDRY, Cleveland 13, Ohio.

ESTIMATOR

With ability to estimate casting weights and costs from blue prints. Give full particulars. Address: Box 762, The FOUNDRY, Cleveland 13, Ohio.

ENGINEER

Applicant to be familiar with the engineering problems pertaining to steel foundry operation as well as problems of construction and design. Give full details on experience, schooling and salary requirements.

BOX 739
THE FOUNDRY CLEVELAND 13, OHIO

GRINDING WHEEL SALESMAN

SALESMAN

With established following to sell finest quality hi-tensile manganese bronze, aluminum bronze and hi-tensile aluminum castings. Commission. New production, first time available. Address: Box 714, The FOUNDRY, Cleveland 13, Ohio.

Representatives Wanted

MANUFACTURERS REPRESENTATIVES

To sell special nonferrous alloys. All territories open. Address: Box 697, The FOUNDRY, Cleveland 13, Ohio.

MANUFACTURERS' AGENTS

British Manufacturers of high quality Parting Powders, Fluxes, Core Binders and other Foundry supplies desire appoint Sales Distributors in U.S.A. Replies to: F. & M. SUPPLIES LTD., 4 BROAD STREET PLACE, LONDON E.C.2, ENGLAND.

Engineering Service

Are you getting the maximum production out of your foundry and its equipment? If you don't think so contact—

PALMER E. HANSON

Foundry Production Engineer
648 Crescent Court
Wauwatosa 13, Wis.

I have thirty years' foundry production and jobbing experience to offer—nothing else to sell.

Positions Wanted

WORKS MANAGER OR FOUNDRY SUPERINTENDENT

Age 44, practical and technically trained. Commercial jobbing and production work. Twenty-six years' experience of which twenty were in executive capacity. Well versed in all phases of jobbing and production work in brass, bronze, aluminum and iron castings. Progressive and up to date in modern methods. Capable of taking complete charge of foundry or foundries. Salary expected $10,000 plus bonus. Available on short notice. Address: Box 790, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGER OR SUPERINTENDENT

With excellent education and twenty-seven years successful experience in molding practice, technical control, roll making, alloys and labor relations. Address: Box 791, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

Mature, profit-minded, dependable. Has successfully managed four companies—two taken out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales finance and production. Excellent experience, foundry, machine and related lines. Address: Box 668, The FOUNDRY, Cleveland 13, Ohio.

GREY IRON FOUNDRY EXECUTIVE

Thirty years' experience in the production of quality castings and all phases of foundry operation. Practical and technical. Green and dry sand. Mix iron by analysis. Cupola supervision, grey iron metallurgy, quality control, foundry costs, consulting and advisory work. Address: Box 676, The FOUNDRY, Cleveland 13, Ohio.

MANUFACTURING OR FOUNDRY MANAGER

With ten years of specialized technical shop training and twelve years of management experience all of which was in manufacturing grey iron castings. Well versed in production or jobbing work up to six ton. Forty-five years of age, 26 years of experience and very reliable. Address: Box 709, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

Well qualified in all phases of foundry operations. 33 years' practical experience including 13 years as foundry foreman. In the diesel engine, machine tool and jobbing field. Light, heavy and pit work, green or dry sand. Cost minded. Excellent references. Available immediately. Twenty-three years with last firm. Address: Box 782, The FOUNDRY, Cleveland 13, Ohio.

CAN YOU USE A MAN AGE 43

With 25 years' foundry experience, 19 years in grey iron on light and medium castings, 2 years in aluminum and 4 years in magnesium and 7 years as foundry foreman. Scrap record of less than 5%. Will accept job as foundry foreman, assistant foundry foreman, night foreman or scrap control inspection. Salary secondary to chance for advancement. Understand cupola operation, gating and sand conditioning. Prefer job in midwest, south or southwest. Excellent references furnished. Address: Box 785, The FOUNDRY, Cleveland 13, Ohio.

SALESMAN

Foundryman with following seeks representation gray iron foundry also metal and malleable iron foundries. Territory Metropolitan New York, Northern New Jersey. Commission basis. Address: BOX 789, THE FOUNDRY, 16 E. 43rd ST., NEW YORK 17, NEW YORK.

FOUNDRY MAINTENANCE FOREMAN

Over 25 years' experience as maintenance foreman in modern foundries, can take complete charge and supervise men. Background tool maker technical and engineering schooling. Employed now, can give good references. Address: Box 788, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRYMAN

Desires position as foreman or superintendent—23 years' experience. Soil pipe, light jobbing, production, gray iron and nonferrous. Address: Box 750, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGEMENT NOTE:

21 years' practical experience in all phases of foundry work and supervision to foundry managing. Experience has been in a varied line of castings from 1 lb. to 30 ton, in steel and high alloys, also in iron and cupola practice. Well qualified for any foundry assignment. Address: Box 712, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN OR ASSISTANT

Either grey iron or malleable with 15 years practical experience. Prefer position in or near Milwaukee area. Address: Box 778, The FOUNDRY, Cleveland 13, Ohio.

PLANT SUPERINTENDENT OR ASSISTANT

Iron or nonferrous, very capable with better than average background and record. Excellent references. Available after January 1st. An interview quickly arranged. Address: Box 780, The FOUNDRY, Cleveland 13, Ohio.

NONFERROUS FOUNDRY FOREMAN OR MOLDER

Practical experience high grade ornamental bronze castings. Small or large. Chicago district only. Address: Box 781, The FOUNDRY, Cleveland 13, Ohio.

DEAR MR. PRESIDENT

I understand you would like to break in a young (35 years) married man to assist you in your plant management and operation. I have had six years of college, four years as a foundry trainee, five years in a supervisory capacity and am at present a technical advisor. If you are interested please contact me through: Box 783, The FOUNDRY, Cleveland 13, Ohio.

ENGINEER OR SALES ENGINEER

Available soon. Three years Engineering Officer U. S. Navy. Two years metallurgist large production foundry. Two years sales and service to foundry and related industries. B.S. Degree in metallurgical engineering. 27 years old, married. Exceptionally successful record. Desire location Cleveland and vicinity. Address: Box 776, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGER—SUPERINTENDENT

Top foundry executive available. Thirty years' practical experience in all phases of grey iron jobbing and production procedure. One of the best in the business. References. Address: Box 786, The FOUNDRY, Cleveland 13, Ohio.

INDUSTRIAL ENGINEER

Would like to make connection with a good reliable concern. Several years' experience in malleable, steel, gray iron and aluminum. Very good background in time study methods, production and cost control. Address: Box 793, The FOUNDRY, Cleveland 13, Ohio.

PLANT ENGINEER

Can become available for a job with a good future. Experienced in maintenance and engineering of mechanized foundry. Must be in small or medium sized city. Address: Box 772, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Age 48—30 years' practical foundry experience with past nine years in special aluminum alloys, jobbing and experimental work. Desire change. Prefer aluminum foundry or will try selling supplies. Address: Box 761, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Twenty-eight years' experience as foundry superintendent. Practical molder. Understand cupola thoroughly. Prefer position with foundry making high grade castings. At present employed. Address: Box 571, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

WORKS MANAGER
OR
FOUNDRY SUPERINTENDENT

Thoroughly capable and of proven ability to reduce costs, reduce scrap percentage and to better quality of castings. Good handler of labor relations. Ferrous metals. Address: Box 595, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY CONSULTANT

With 45 years' actual foundry experience specializing in problems of mechanical foundries, regulating production and reducing scrap. Address: Box 429, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY ENGINEER

Engineering graduate with 5 years' experience in ferrous and nonferrous operations. Have supervised every phase of foundry operations. Desires connection with Eastern outfit as assistant to Superintendent or plant manager. Also interested in sales. Address: Box 794, The FOUNDRY, Cleveland 13, Ohio.

Opportunities

OPPORTUNITIES

Fully equipped nonferrous foundry located in Detroit — going business — approximately 7000 square feet—building 30 feet high monitor type construction. Will sell or lease very reasonably. Address: Box 654, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED

C type straightening press with 300 ton vertical—150 horizontal rams.

1—48" Hydrol grinder—12" stroke
1—72" x 72" x 144" planer

BOX 779
THE FOUNDRY CLEVELAND 13, OHIO

WANTED

One model 505 Riehle or similar tensile testing machine.

BOX 769
THE FOUNDRY CLEVELAND 13, OHIO

WANTED

Power driven turntable approximately 18' diameter.

NYLEN PRODUCTS COMPANY
ST. JOSEPH, MICHIGAN

WANTED

Cupola charger. Capacity, one ton metal charge for use on 72" cupola. 220 volts, 3 ph. 60 cycle.

THE BOSTICK FOUNDRY COMPANY
LAPEER, MICHIGAN

WANTED

Patterns for Bell and Spigot and Flanged cast iron fittings, sizes 4-inch and larger. Address: Box 612, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED

Late model American Wheelabrator tumblast machine, either 36 x 42 or 42 x 48. Must be in good condition with skip hoist, with or without dust collector. Give age, condition and best price. Address: Box 763, The FOUNDRY, Cleveland 13, Ohio.

WANTED

One jolt rollover, power operated with pattern plate size 34" x 58". Must be good condition and cheap. Address: Box 770, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Jolt squeeze strippers 20" dia. squeeze cylinder or larger. Address: Box 774, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Air compressor to supply 500 actual cfm at 100 pounds pressure. Give full description, age, make, condition, price. Address: Box 730, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Induction furnace with capacity between 250 and 500 pounds complete with switchboard and generator. Send specifications and price. Address: Box 768, The FOUNDRY, Cleveland 13, Ohio.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Ajax induction melting furnace, 20 or 50 kw. Motor generator set water cooled. Prompt reply required. Address: Box 784, The FOUNDRY, Cleveland 13, Ohio.

Open Capacity

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

Foundries For Sale

FOR SALE OR LEASE
WITH PURCHASE OPTION

Iron foundry, located in Bridgman, 10 miles south of St. Joseph, Mich. Here is an opportunity to acquire an exceptionally fine plant suitable for heavy grey iron castings, or production lines. Main building has two crane-covered floors 240 ft. long; steel, brick and concrete construction. Total floor area 50,000 sq. ft. Land—7½ acres inside steel fence. C.&O. R.R. sidings. Stoker-fired boiler serves unit heaters; exhaust fans in roof. This very unusual set-up would justify moving your foundry operations from congested city to small town affording good labor supply where living conditions are excellent. For information, address:

Mr. M. R. GAULT
HANNIFIN CORPORATION
1101 S. KILBOURN AVE. CHICAGO 24, ILL.

Foundries For Sale

FOR LEASE
GRAY IRON FOUNDRY

Eastern central Indiana, fully equipped, large working inventory, attractive lease proposition available immediately. Large profit possibility. Address: Box 736, The FOUNDRY, Cleveland 13, Ohio.

PLANT FOR SALE

26,000 square feet, modern steel fire proof building, insurance rate .27 building and contents, concrete floor on one level, 4,000 feet office and other building. Railroad siding, electricity, natural gas, soft filtered water, site 4.2 acres, low taxation. Transportation and every phase of labor excellent. Within corporate limits progressive Georgia city on Eastern Air Lines. Bargain for purchaser. Direct dealings. Address: Box 787, The FOUNDRY, Cleveland 13, Ohio.

PROFITABLE GOING FOUNDRY

Produce gray iron castings at lowest cost to meet today's competition. Ideal setup—modern small town foundry near industrial centers. Owner retiring. Good customers—profitable going business. Address: HURJA, 105 W. MONROE, CHICAGO 3, ILL.

For Sale

FOR SALE

TURBO BLOWERS (3 Phase, 60 Cycle)

cfm	Pressure	Make	Motor H.P.	Volts	Speed
3500	40 oz.	Spencer	60	440	1800
2200	40 oz.	Spencer	40	220/440	3600
1400	16 oz.	Spencer	220/440	3/60	3600
1050	32 oz.	Spencer	15	550	3500
900	24	Spencer	15	220/440	1800
225	10	Spencer	1	220/440	3600
PRESSURE BLOWERS (3 Phase, 60 Cycle)					
2500	7 oz.	Sturtevant	15	220/440	1800
2400	14 oz.	Mahr	15	220/440	3480
1300	16 oz.	Nth. Amer.	10	440	1800
1150	20 oz.	Nth. Amer.	10	220/440	3600
950	16 oz.	Nth. Amer.	7½	220/440	3600
660	20 oz.	A & B	7½	440	3600
550	20 oz.	A & B	5	440	3600
450	6 lbs.	A & B	30	220/440	3450
340	20 oz.	A & B	3	440	3600
250	12 oz.	Gen. Elec.	2	220/440	3600
150	12 oz.	Nth. Amer.	1	220	3600

MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND, OHIO
FOR SALE

GOOD USED EQUIPMENT

Sly Dust Collecting System, consisting of 3 Sly #62 Dust Filters to handle 15,000 CFM each. Motors 220/440 volt, 3 phase, 60 cycle. Was erected, but not used.

2—5-ton Bridge Cranes, 30' span, 3 motor, cab operated, 230 volt DC, equipped with Magnet controller and enclosed cab.

1—5-ton P&H 41' span, floor controlled, Bridge Crane, 220 volts, 3 phase, 60 cycle.

1—3-ton Shaw, 44'5" span Crane with load lifter hoist, 220 volts, 3 phase, 60 cycle, floor controlled.

2—Chicago pneumatic Air Compressors, 225 CFM capacity, 100# pressure, 2 stage.

IRA C. JORDAN
2508 EAST BELLEVIEW PLACE
MILWAUKEE 11, WISCONSIN

FOR SALE

2—Osborne #601 Molding Machines
1—Osborne #275-J Jolt Squeezer
1—Spencer Turbo Compressor, 1300 Cu. Ft. Per Min. @ 32 oz, 25 HP, 3 PH, 60 CY, 220-440 V, 1750 RPM, Westinghouse Motor
1—36 x 42 American Wheelabrator Tumblast
1—Sly Centriblast Table, 6 Ft. diameter. Used 30 months.

BOX 765
THE FOUNDRY CLEVELAND 13, OHIO

Classified Advertising

For Sale

FOR SALE
FOUNDRY EQUIPMENT

A large Massachusetts manufacturing concern has just discontinued its gray iron foundry operations to expand manufacturing facilities, thereby making all of its foundry materials, equipment and machines available for sale. The equipment and machines are all in good operating condition and consist of the type generally used in floor, bench and machine molding, such as:

CARL-MAYER BATTERY OF FOUR (4) CORE OVENS EACH AUTOMATICALLY OIL FIRED.
AMERICAN SAND CUTTER, NO. 766 MODEL D SIZE 96/78.
AMERICAN SAND CUTTER, NO. 238 MODEL M SIZE 99/80.
VIBRATING SCREEN, 6' x 4'.
LANCASTER COUNTER CURRENT RAPID BATCH MIXER — BUCKET LOADER — 15 HP, 550 VOLT 60 CYCLE 3 PHASE MOTOR.
AMERICAN WHEELABRATOR, 48" x 42" WITH DUST COLLECTOR AND BLOWER.
WILBRAHAM GREEN NO. 6A ROTARY PRESSURE BLOWER WITH 40 HP, 550 VOLT 60 CYCLE MOTOR.
TABOR MOLDING MACHINES OF VARIOUS TYPES, CHARGING CARS, STEEL FLASKS OF VARIOUS SIZES, ETC.

For full details of items you may be interested in or should you want to make a personal inspection at our plant—Write

BOX 767
THE FOUNDRY CLEVELAND 13, OHIO

GRAY IRON FOUNDRY EQUIPMENT FOR SALE

Capable of handling thirty-five molders
Jolt Squeezers
No. 5 Whiting cupola complete with skip hoist and all controls
Two (2) 500 pound Bowl Ladles
Nine (9) Tumbling Mills
Four (4) Grinders and Shaft complete
Several Large Motors
One (1) American Sand Cutter, model AN 7450 complete with motor, cable, and five wall sockets
NEW One (1) CP Compressor
One (1) Gardner Denver Compressor used two years

DeKALB FOUNDRY CORP.
DeKALB, ILL.

FOUNDRY EQUIPMENT AVAILABLE FOR DISPOSAL

1 Clearfield Sand Mixer—Model C-610 Machine #211-6—Pattern #1806077 with (1) 20 HP Motor 220/60/3 and (1) #2 Bucket Loader.
1 Herman Pneumatic Molding Machine 60" x 80" x 20"—#PC6847—Ser. #3971.
1 Pangborn Sand Blast & Dust Collector with (1) 12' 6" wd. 11' 2" lg. Compartment (1) 16' wd. 11' 2" lg. Compartment. Type AU-V. Ser. #12111359—W/Motor 220/60/3.
1 Hayward Electric Motor Clam Shell Bucket—¾ yd. #4532 with (1) Class A-5 Controller #28819 (1) Feeder Cable #12-4 (1) Cable Coupler—B-6-A (1) Take-Up Reel, Type "C" #ED-1312.
1 Royer Sand Mixer or Slinger (Sand Separator and Blender) Model D3703 W/Mtr. 220/60/3.
1 Cupola—72"—18½ ton Single Lining (At present double Lining 54" — Capacity — 10 Ton) W/Motor and Blower.
1 Buffalo Model Floor Scales—Capacity 5 Tons.

AMES IRON WORKS OF
PIERCE BUTLER RADIATOR CORP.
OSWEGO, NEW YORK

LOOKING FOR PNEUMATIC TOOL BARGAINS?

War surplus #2 Chicago pneumatic ring valve chipping hammers at $17.50 post paid anywhere in the U. S. These are used but not abused or worn out tools and are sold on a money back or replacement basis.

We also have a limited amount of Ingersoll Rand #2 x M ⅞" capacity air drills at $27.50 each.

INQUIRE ON OTHER SURPLUS BARGAINS IN GRINDERS, SCALERS, RIVETERS.

R. D. SHERRILL & CO.
535 ELLIOTT AVE. WEST SEATTLE 99, WASH.

For Sale

FOR SALE

Multiple-pass vertical core oven, 24' x 16½' x 11½', gas fired, cross bar conveyor, cooling zone, Leeds & Northrup controls, rack size 31" x 14" x 25". Excellent condition. Cost $30,000—our price $7,000.

Fresh air supply system, 40,000 CFM, with 154 sq. ft. oil filter system, gas fired, 7½ HP combustion blower. All electrical controls. Cost $16,000—our price $4,000.

Gardner-Denver vertical air compressor with after-cooler and 40 HP 220/440 volt motor and starter. Our price $850.

H. H. DAVIS CO., INC.
1750 N. KIMBALL AVE. CHICAGO 47, ILL.

DO YOU NEED QUALITY FOUNDRY EQUIPMENT?

Check on the surplus equipment, in excellent condition, we are offering at attractive prices. Here is opportunity to buy exactly what you need directly from well-rated, bona fide manufacturer—no brokers. Your request for a detailed list of available items will be answered promptly.

BOX 777
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

At small fraction of original cost:

6—36 x 60 Sly tumbling mills
2—24 x 48 Sly tumbling mills
2—48 x 60 Sly tumbling mills
1—30 x 120 Sly tumbling mills
2—Link Belt anti-friction type mold conveyors 71'6" center to center, 24 x 45" trays
1—Whiting 2 ton crane 18'2" span, minus gear case
3—#601 Osborn molding machine, jolt rollover
1—Beardsley & Piper #40 speedmuller
6—#J275 Osborn jolt squeeze molding machines
3—Swing frame grinder 24" wheel 15 HP, DC
3—#G-104 International jolt rollover machines, 36 x 12"
2—Johnston & Jenning #918 jolt rollovers
2—Johnston & Jenning #815 jolt rollovers
4—Herman jolt rollovers 40 x 50" table

BOX 773
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

One International pin lift molding machine, type JDT, serial number 54754-6, size 1600 x 10, 36" table. In good condition. Address: Box 771, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Two (2) Heroult electric arc furnaces, side door charge, roof removable, complete except that no furnace transformers are included. Electrical control equipment available for one furnace only. In good condition. 8' diameter shell. 7,500 pound capacity.

Two (2) Osborn stationary #332-38 jolt squeeze rollover power draw molding machines. In excellent shape.

Both items are offered for any reasonable price. Space needed.

LEBANON STEEL FOUNDRY
LEBANON, PA.

FOR SALE

Dust collector. American Air Filter type W roto clone, arrangement D. Wet system. Capacity 6000 CFM. Equipped with stainless steel impeller blades. Only slightly used. Excellent condition. Price quoted, without motor or electrical controls on request. Address: UNIVERSAL FRICTION MATERIALS COMPANY, 303 WEST RUSH STREET, KENDALLVILLE, INDIANA.

For Sale

FOR SALE

WE HAVE CLOSED OUR GRAY IRON FOUNDRY AND HAVE THE FOLLOWING EQUIPMENT FOR SALE:

4 Type R94 Pioneer Molding Machines.
8 Model 104-5 Milwaukee Molding Machines.
1 Connersville Heavy Duty Horizontal Blower Complete with Pulleys, Safety, Switches and Controls.
1 Fairbanks Morse, 30 h.p. Induction Motor, 60 Cycle, 220 Volt, 3 Phase.
1 Modern Equipment Company #4 Foundry Cupola.
1 Portable Sand Cutter, 6' Long and 3' in Diameter Complete with Motor, Controls and Safety Switches.
1 Hauck Manufacturing Company Gas Fired Ladle.
6 Modern Equipment Company, 150 lb. Ladles Complete.
3 Modern Equipment Company, 600 lb. Ladles Complete.
1 F & H, 1 Ton, Electric Lift with Cable and Motor.
1 20 h.p. Louis Allis 1740 R.P.M. Motor.
3 Louis Allis, 1 h.p. 1140 R.P.M. Motors.
1 Beardsley & Piper Company Model S Screenarator.
1 International Molding Machine, Model 3711—14X8R.
1 American Air Filter, 36" x 36" x 24" High Steel Dust Collector Complete.
1 Delco 7½ h.p. 1160 R.P.M. Motor.
1 Modern Equipment Cupola Charging Unit with 30" Capacity Steel Bucket Guildes, Cable, Motors, Controls, Complete.

Aluminum Alloy Flasks, Hardwood Flasks and Many Other Pieces of Foundry Equipment.
This equipment will be sold first come—first served. Make us an offer!

PICK MANUFACTURING COMPANY
WEST BEND WISCONSIN

FOR SALE

149—Truscon Steel Flasks—Pin on each end —12 x 16, 4 Cope & 4 Drag
49—Truscon Steel Flasks—Pin on each end —12 x 18, 5 Cope & 5 Drag.
190—Truscon Steel Flasks—1 Pin on each end —12 x 18, 3 Cope and 3 Drag.
145—Sterling Steel Flasks—1 Pin on each side —12 x 18, 3 Cope & 3 Drag.
119—Truscon Steel Flasks—1 Pin on each side —12 x 18, 3 Cope & 3 Drag.

These Steel Flasks are practically new.

2—Tabor, Air Jolt, Rollover Machines 14 x 16 Table.
1—Pouring Device.
1—Globe Tilting Water Tumbler.
1—American Sand Cutter, Gasoline Driven.
1—Johnson & Jennings 24 x 30 Rollover.
1—Tabor 30 x 40 Rollover Machine.
1—27 x 36 Wheelabrator.
1—#9 Whiting Cupola complete with Motor, Blower, and Blast Regulator.
10—"G" Power Rollover Machines.
15—Jolt Squeezers of most any make.
Osborn 558 and 559 Jolt Strippers.
J.D.P. International Jolt Strippers.

HAYNES FOUNDRY EQUIPMENT CO.
814 ADA ST. KALAMAZOO 52, MICH.

EQUIPMENT FOR SALE

2—20 H.P. North American blowers, 2700 C.F.M.
3—Metal cutting band saws
60—150 Dixon crucibles
3—Tabor portable cantilever jolt squeeze molding machines
4—Osborn 2047 jolt rollover molding machines

SIX ACRES OF EQUIPMENT
Send us your inquiries

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 E. BROAD ST.
SHILLINGTON READING, PA.
PHONES 3-311—4-0146

FOR SALE
IN GOOD CONDITION

Cupola Blower. One General Electric centrifugal compressor. Type—F.S. 377, volume 10500, pressure 1.25, speed 3500.
General Electric Motor. Type FT 529 Y2 85 3600 Form E, volts 440, 3 phase, 60 cycle, No. 5226386.
With blast gate control panel, blast gate and motor starter.

BOX 699
THE FOUNDRY CLEVELAND 13, OHIO

Classified Advertising

For Sale

FURNACES & OVENS

1—Furnace, melting, rotary hearth, gas, "Continental", approx. 18' dia.
1—Furnace, pre-heating rotary hearth, elec., "G.E.", 175 KW, 18' dia. Cat. No. 5364787 GR-1, with transformers, motors and gas converter.
1—Oven type furnace, "American Gas Furnace Co." #1, 7" x 12" x 29".
27—"Fisher" melting furnaces, size B for #25 crucibles.
7—"Hoskins" electric furnaces, model FR 252.9 box type, 2000 deg. F 26 KW, with 2 transformers
6—"Monarch", Simplex melting furnaces, 500# cap., model #92, oil fired, hand rocking, 1 burner on each end of furnace, rammed with plastic brick and lined with 1" of SO 38 refractory.
1—"Monarch" Simplex furnace, 1000 lb. cap., with blower and mtr.
1—"Ind.-Heating" Circ-Air gas fired, 20 W x 7" ht. x 9' long heating chamber, including motor, blower and controls; conveyor type used for drying, No. 6270-1000°.
1—"Ind. Heating" oven type heat treat comp. with motors and controls No. 8498-2100°. Inside dim. 6 ft long, 18 in. wide, 12 in. high with air cyl. operated door.
1—"Industrial Heating" melting furnaces, pot size 24" L x 19" W x 11" deep with burners, manifold and mixer.

BLOWERS

Crane "American Monorail", 500 lb. cap. with Hyatt model A trolley.
Blower, "Buffalo Forge" size 3½ duplex conoidal with 2 HP motor.
Blower, "American Sirocco" #5 type V syphon with 5 hp motor.
Exhaust system including blower, "American" #5 and 5 HP motor.
"Schmeig" dust collecting system including water tank dust collector, "American" blower No. 35, and one 5 HP motor and one 7½ HP motor.
Blower, "American Sirocco" #5 type V syphon with 5 hp motor.
Blower, "Spencer Turbo" 1000 CFM, 24 oz. with 10 HP motor, 3500 RPM, 440 volt, 3 phase, 60 cycle.
Exhaust system with American blower, type P size 5.
Blower, "American" #6 for foundry ventilation.
Blower, "American Sirocco" #3—5000 CFM with 2 hp motor—man cooler.
Exhaust system for "Fisher" furnaces including hoods (2) stocks, (17) air cylinders and (2) #4 blowers with 3 HP motors.
Blower, "Spencer Turbo" 150 CFM, 24 oz. with motor.

BOHN ALUMINUM & BRASS CORP.
1400 LAFAYETTE BLVD., DETROIT 26, MICH.

FOR SALE

2 Only 4 Ton Model M. Wright Manufacturing Co. Chain Hoists
1—28" Walker York Hot Blast Tilting Furnace
60—Tercod Pedestal Blocks HB-28-11½ HI for above furnace
1—Beardsley and Piper Type MC Screenerator
500#—New 1" Mill Stars
500#—Second Hand 1" Mill Stars
2—Forced Draft Coke Burning Mold Driers
1—6 Ton Model K Cyclone Chain Hoist
1—Sly Duplex Tumbler NTO-30 complete with 5 H.P. motor and reduction gears

THE PRESCOTT COMPANY
MENOMINEE, MICHIGAN

FOR SALE

One Special Whiting No. 9 model B cupola. Purchased new in 1942.
Cupola blower—one General Electric No. 8-367-EI Type FS-367
C.F.M.—8500 Volume 1.25
R.P.M.—3540
One General Electric motor 75 H.P.

BOX 698
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

1 only 1500 lb. melting capacity Greene electric arc furnace, 3 phase—where is, as is—complete up to the transformers. This furnace was built in August, 1930 and was modernized with the installation of modern controls in 1940. For further information, write or call: ELECTRIC STEEL FOUNDRY CO., PORTLAND, OREGON.

For Sale

FOR SALE

1—6 K.W. Ajax Electrothermic high frequency induction unit. Ideal for laboratory work. $800.00

NATIONAL PRECISION CASTING CORP.
CLIFTON HEIGHTS, PA.

FOR SALE

Core Blowers
No. 3 C Demmler
No. 92 Osborn
Redfords
28 cubic foot Pangborn rocker barrel
also Hines flasks, screenerators, molding machines, air hoist, etc.

BALCHER MACHINERY SALES
1884 S. COMPTON RD.
CLEVELAND HEIGHTS 18, OHIO
FA 1186

FOR SALE

ELECTRIC MELTING FURNACE

TOP CHARGE 9 FT. DIAM. SHELL, WITH 2500 KVA TRANSFORMER. VERY LITTLE USED, IN GOOD CONDITION.

FRANK B. FOSTER, INC.
8217 OLIVER BLDG. PITTSBURGH 22, PA.

FOR SALE

Slightly used Beardsley & Piper junior motive sand slinger in excellent condition. New in 1946.

FRANK W. SMITH, INC.
450 CHESTNUT ST. GARDNER, MASS.

EQUIPMENT FOR SALE

1—4" dia. x 5' long—Sly tumbling mill with worm gear drive and 220 volt—60 cycle, 3 phase motor. Address: DeZURIK SHOWER COMPANY, SARTELL, MINNESOTA.

EQUIPMENT FOR SALE

PANGBORN SHOT BLAST ROOM

New—never installed. Size 12' x 25' with two blast chambers, complete with new Pangborn Dust Collector, 60 cycle A. C. motors.

BEARDSLEY & PIPER SANDSLINGER

Motive Jr. track traveling type; had very limited use—excellent conditions.

BEARDSLEY & PIPER SAND CONDITIONER

In fine condition—used about one year. Magnetic pulley.

SIMPSON SAND MULLERS

3 machines available—one is practically new.

SULLIVAN W. G. 9—75 H.P.
—AIR COMPRESSOR

SULLIVAN NO. 16—125 H.P.
—AIR COMPRESSOR

Both in very fine condition, with complete electrical equipment; 220 Volt, 60 cycle A. C.

Other equipment:—No. 7 Whiting Cupola with new Foxboro Air Weight Control; Complete Laboratory; American Sand Cutter; American Dustube Collector; Whiting Tumbling Mill; Mold Wash Mixer; Hendey Mobile Yard Crane with Lifting Magnet. For information, address:

MR. M. R. GAULT
HANNIFIN CORPORATION
1101 S. KILBOURN AVE. CHICAGO 24, ILL.
TELEPHONE NEvada 8-0406

For Sale

EQUIPMENT FOR SALE

MOLDING MACHINES
1—74J-W Osborn Jolt Squeeze Portable.
2—75J-W Osborn Jolt Squeeze Portable.
3—75J Osborn Jolt Squeeze Portable.
3—Federal RAPID Jolt Squeeze Portable.
2—SPO #611B Stationary, Oscillating, Jolt Squeeze Strippers.
1—SPO #4½ JHS Air Jolt Hand Strip.
BLOWERS FOR CUPOLAS AND FURNACES
3—Spencer Turbine pressure blowers 1200 CFM at 20-oz. 10 HP motor.
1—Piqua rotary pressure blower, rated 19 cu. ft. per revolution.
Maxon-Premix Blowers for Gas, ¼ to 1 H.P.
METAL MELTING EQUIPMENT
1—Hausfeld 2000# aluminum capacity furnaces, barrel type, open flame, oil fired.
2—Monarch-Rockwell Rotating, 500# brass, oil.
1—Buckeye #150 Crucible tilting furnace, with Premix blower for gas fire.
New 32" to 41" Dia. shell Cupolas made to order.
TUMBLING MILLS AND SAND BLAST
3—36" dia. x 54" long reliable tumbling mills.
1—Pangborn style GJ-1 rotoblast barrel, complete with Pangborn style FM automatic loader. Load capacity approximately 16 cu ft.
1—Pangborn No. 2 GH direct pressure type sandblast barrel, motor driven. Complete unit.
1—Pangborn LE 6 ft. sandblast table, continuous sand feed, motor driven. Complete unit.
1—Pangborn LE 4 ft. sandblast table, continuous sand feed, motor driven. Complete unit.
1—Pangborn Sand Blast Unit including generating tank, shot cleaner, bucket elevator. Suitable for use with room.
1—Pangborn type EN-2 sand blast cabinet, suction type, 5 x 3 x 7 high.
MISCELLANEOUS
4—Heavy duty flexible shaft grinders 2 HP.
1—Fay & Egan 14" blade revolving, double arbor, tilting table, variety saw with roller table.
1—Young Bros. Co. tower core oven, 5' x 1' shelves, gas fired, complete with Foxboro Control.
1—Young Bros. Co. batch type recirculating hot air gas fired core oven, 5' x 6' door opening, 9' deep.
3—Foundry Equipment Co., Sliding shelf core ovens with five 30 x 42" shelves, 8" high. Gas Fired.
1—Lampson Endless Mold Conveyor 100' long x 16' wide, with 19 x 26" pallets, 36 inches on centers.

CLIFTON MACHINERY CO.
1023 W. 6th ST. CINCINNATI 3, OHIO
PHONE PARKWAY 7812

REBUILT EQUIPMENT

20—Osborne Jolt Squeezers, Type 275J
2—International R.O. 20 x 8, Type G
4—International R.O. 24 x 10, Type G
1—Herman R.O., 1500 series

1—Simpson #2, Motor Drive—with Loader
1—#30 B. & P. Speedmullor, with Loader
1—27" x 36" American Wheelabrator
2—Model "S" B. & P. Screenarators
2—Royer Sand Aerators, Size D

RAY P. SCULLY
SCULLY MACHINERY & EQUIPMENT CO., NOT INC.
767 MILWAUKEE AVE., CHICAGO 22, ILL.
PHONE: CANAL 6-0314

FOR SALE

One Dings magnetic separator 42" dia. 110 volts D.C. for mounting on end of dryer or rotary screen at substantial savings. Never used due to change in process. Still in original crate. Address: Box 704, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Whiting #3, model B cupola, complete with automatic skip-hoist, blower and spark arrester. Herman Pneumatic turnover and pattern drawing machine, 40" x 58", 3000 lb. 18" cylinder, equipped with 45" arms, practically new, complete with controls. Two Kron (Yale & Towne) scales, one 2700 lb. portable platform (30" x 30"), other 1100 lb. dormant platform (46" x 38"). For further details, write BOX 706, THE FOUNDRY, CLEVELAND 13, OHIO.

Classified Advertising

For Sale

FOR SALE

TUMBLAST

ROTO-BLAST

FOUNDRY EQUIPMENT

1—36" x 42" TUMBLAST, complete with Skip Loader, Dust Collector and Spare Parts—LIKE NEW.

1—27" x 36" TUMBLAST, with Skip Loader—REAL BARGAIN.

2—#2 Multi-Table TABLAST — PRICED TO SELL.

1—Pangborn ROTO-BLAST, Horizontal Spindles—NEW, NEVER INSTALLED.

1—Pangborn Hand Sandblast Cabinet, complete with Dust Collector—Excellent Condition.

MOLDING MACHINE

1—#383 Osborn Jolt Squeeze Roll-Over—Like New—CHEAP.

GRINDER

1—15 H.P. U. S. Swing Frame Grinder complete, 24" x 3" Wheel—Used Very Little.

Location: Our Cincinnati Warehouse
PHONE: Mr. Don Whitehead
PRINCETON 8405 (Glendale, Ohio)

L. J. LAND, INC.
146 GRAND STREET
NEW YORK 13, N. Y.
CANAL 6-6976

For Sale

FOR SALE

Patterns for cast iron soil pipe fittings and lengths (aluminum) loose and on stripping plate machines, also arbors, flasks, etc. Good condition. Any reasonable offer considered. Address: Box 775, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALARIED PERSONNEL

$3,000-$25,000. This reliable service, established 1927, conducts confidential negotiations for high-grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

SALARIED POSITIONS

$4,000 to $30,000. This confidential service for men who desire a new connection will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Address: TOMSETT ASSOCIATES, 1203 BERGER BLDG., PITTSBURGH 19, PA.

SALARIED POSITIONS
$3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (40 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 DUN BLDG. BUFFALO 2, N. Y.

For Sale

EMPLOYERS
ESTABLISHED 1922

Specializing in thorough screening of qualified personnel for any phase of operations in gray iron, steel, malleable, all non-ferrous and permanent mold foundries.

APPLICANTS:

If you can furnish QUALIFIED references, attesting to your CAPABILITY and DEPENDABILITY, your application will be accepted and we will secure for you the desired position.

IMMEDIATE OPENINGS
(Partial Listing)

MANAGERS
SUPERINTENDENTS
ASS'T SUPTS.
GENERAL FOREMEN
CORE ROOM FOREMEN
MOLDER FOREMEN
CLEANING ROOM FOREMEN
CUPOLA SUPERVISORS
SR. INDUSTRIAL ENGINEERS
JR. INDUSTRIAL ENGINEERS
TIME STUDY ENGINEERS
PATTERN DESIGNERS
PERM. MOLD DESIGNERS
PERM. MOLD FOREMEN
PATTERN FOREMEN
MASTER MECHANICS
PLANT ENGINEERS
MAINTENANCE SUP'TS.
MAINTENANCE FOREMEN
LABOR FOREMEN
METALLURGISTS
CHEMICAL ENGINEERS
CHEMISTS
PRODUCTION CONTROL
SALES ENGINEERS
ACCOUNTANTS

If you are experienced in any phase of foundry operations—and desire to improve your future working conditions:

WRITE
EMPLOYERS SERVICE BUREAU
6 NORTH MICHIGAN AVE., SUITE 708
TELEPHONE: FInancial 6-1155
CHICAGO 2, ILLINOIS

CLASSIFIED ADVERTISING RATES

POSITION WANTED—Minimum advertisement set solid, 30 words, $2.00. Additional words 7c each.

ALL OTHERS—"Help Wanted"—"For Sale"—"Wanted"—"Personals"—"Services", etc., minimum advertisement set solid, 30 words or less, $4.00. Additional words 12c each.

NOTE—If replies are to be sent to a box number in care of THE FOUNDRY, add 6 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

INCH RATES PER INSERTION

Single Column 2¼" Wide	One Time	Three Times	Six Times	Twelve Times
1 inch	$ 12.00	$11.00	$10.00	$ 9.00
2 inches	21.75	20.00	18.25	16.75
3 inches	32.00	29.25	26.75	24.00
4 inches	40.00	36.75	33.25	30.00
5 inches, ½ col.	48.00	44.00	40.00	36.00
6 inches	58.75	53.25	48.00	42.75
7 inches	66.00	60.00	54.00	48.00
8 inches	73.25	66.75	60.00	53.25
10 inches, 1 col..	88.00	80.00	72.00	64.00
Half Page	130.00	120.00	110.00	100.00
Full Page	220.00	200.00	180.00	160.00

Remittance should accompany advertisement when submitted—Cash Discount 2%, 10 days.

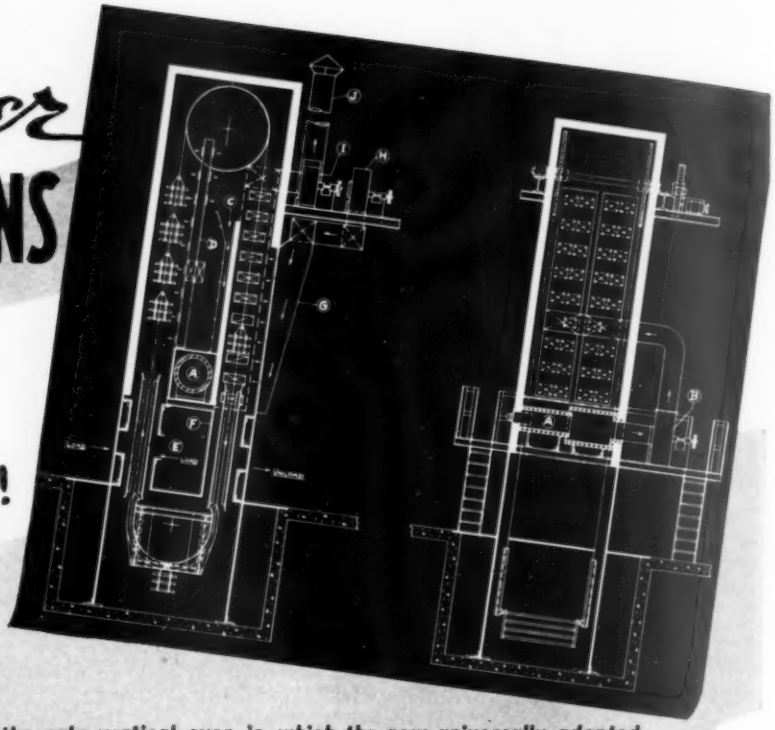
THE FOUNDRY

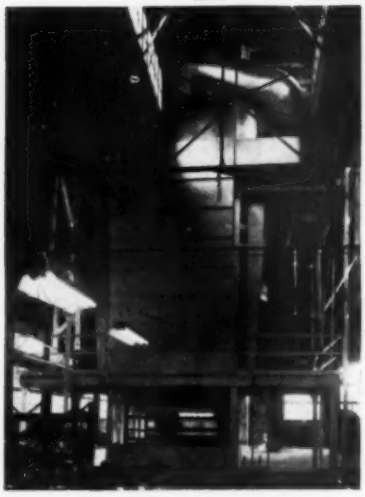
Penton Building, Cleveland 13, Ohio

Carl-Mayer
VERTICAL CORE OVENS

PATENT NO. 2,257,180

THE MOST MODERN, FINEST, MOST EFFICIENT VERTICAL OVENS BUILT!





This is the only vertical oven in which the new universally adopted recirculating heating system, with completely sealed combustion chamber, may be located between the conveyor chains. Patent No. 2, 257, 180.

Many Reasons for CARL-MAYER Superiority:

Because of the following features in the Carl-Mayer Vertical Core Oven, outstanding results are guaranteed—FASTER BAKING, LOWER FUEL CONSUMPTION, SMALLER CORE LOSSES, SAFER OPERATION, ELIMINATION OF SMOKE, COOLED CORES AT UNLOADING STATION, REDUCED LABOR COSTS.

- The completely sealed combustion chamber (A) prevents hot combustion gases (1,200° or over) from going directly into the oven chamber, *preventing non-uniform temperatures and burned cores.*
- The combustion chamber (A) located between conveyor strands, *saves space* as compared with vertical oven designs locating the heater external to the oven.
- The external heat fan (B) takes the heated air from the combustion chamber and after tempering with fresh and recirculated air from duct (C) delivers it to the vertical plenum chamber (D). Result: *fast, uniform circulation of heated air—faster baking.*
- Plenum chamber (D) is arranged to insure uniform cross flow of heated air over each passing carrier shelf, resulting in uniform flow of heated air across cores. Result: *uniform fast baking.*
- The "Thru-Passage" (E) properly designed is an old practice used in ceramic drying, and has long proved its efficiency in similar drying procedures. *Permits loading from inside as well as outside.*
- Arrangement of "Thru-Passage" designed by Carl-Mayer (patents applied for) with partition (F) facilitates loading from both inside and outside of oven *but* limits the *unloading* to one side. This is a proven forward step, permitting adequate and fast unloading without the temptation to unload from the inside as well, with its resultant interference with loaders and danger of damaged cores.
- Cooling duct (G) and cooling fan (H) designed according to oven height and loading conditions, assure a uniform flow of cooling air across the cores on the down side to obtain *maximum cooling.*
- Cooling exhaust system, with cooling exhaust fan (I) and collector ducts, assures *prompt and safe removal of combined cooling and exhaust products and smoke from the baked cores.*
- Inspirator type oven exhaust stack (J) utilizes the spent work of the cooling exhaust fan to further remove fumes and to *prevent pocketing of any explosive gases.*

Typical Users of CARL-MAYER VERTICAL OVENS

Aluminum Co. of America
Burt Foundry Co.
Cadillac Motor Co.
Eclipse Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
General Motors Corp.
General Steel Castings Co.
Harrison Radiator Co.
Henry Kaiser
H. B. Salter Co.
McKinnon Industries
Quality Castings Co.
Packard Motor Co.
Richmond Radiator Co.
Union Brass and Metals Mfg. Co.
West Michigan Steel Castings Co.

CORE OVENS, MOLD OVENS -- *all types*

THE CARL-MAYER CORPORATION
3030 Euclid Ave., CLEVELAND, OHIO

Backed by Over 30 Years' Experience

ADVERTISING INDEX

A

Acheson Colloids Corp. 129
Adams Co., The 50
Ajax Electric Co., Inc. 149, 186, 187
Ajax Electric Furnace Corp. 149, 186, 187
Ajax Electrothermic Corp. 149, 186, 187
Ajax Engineering Corp. 149, 186, 187
Ajax Metal Co. 149, 186, 187
Alloy Metal Abrasive Co. 225
American Air Filter Co., Inc. 19
American Bridge Co. 226
American British Chemical Supplies, Inc. . 232
American Crucible Co. 171
American Foundrymen's Society 141
American Gum Products Co. 230
American MonoRail Co., The 42
American Optical Co. 44
American Smelting & Refining Co. 227
American Tank & Fabricating Co. 257
American Wheelabrator & Equipment Corp. 33, 34, 35, 36
Angell Nail & Chaplet Co., The 229
Arrow Tools, Inc. 221
Asbury Graphite Mills Inc., The 216

B

Baroid Sales Div., National Lead Co. . . . 204
Bartlett, C. O., & Snow Co., The 107
Bay State Abrasive Products Co. 145
Beardsley & Piper Div., of Pettibone Mulliken Corp. 176, 177, 178, 179
Black, Sivalls & Bryson, Inc. 173
Buckeye Products Co., The 223
Buffalo Pattern Works 103

C

Campbell-Hausfeld Co., The 203
Carborundum Co., The 22, 23, 38
Carl-Mayer Corp., The 254
Centrifugal Casting Machine Co. 226
Champion Foundry & Machine Co. 8, 9
Chicago Mfg. & Distributing Co. 233
Clayton-Sherman Abrasives Co. 45
Clearfield Machine Co. 127
Cleveland Chaplet & Mfg. Co. 233
Cleveland Flux Co., The 165
Cleveland Metal Abrasive Co., The . . 200, 201
Cleveland Tramrail Div., The Cleveland Crane & Engineering Co. 120, 121
Cleveland Vibrator Co. 214
Climax Molybdenum Co. 211
Combined Supply & Equipment Co., Inc. . 228
Corn Products Refining Co. 157
Crescent Brass & Pin Co. 175
Crobaugh, Frank L. Co., The 228
Crucible Manufacturers Assoc. 206

D

Davenport Machine & Foundry Co. 14
Dayton Pneumatic Tool Co. 225
DeBardeleben Coal Corp. 234
Delta Oil Products Co. 10
Demmler, Wm., & Bros. 46, 229
Detroit Electric Furnace Div., Kuhlman Electric Co. 30, 31
Detroit Sheet Metal Works 234
Dietert, Harry W., Co. 231
Dollinger Corp. 27
Dravo Corp. 229

E

Eastern Clay Products, Inc. 40
Eastman Kodak Co., X-Ray Div. 115
Electric Furnace Co., The 228
Electro Metallurgical Div., Union Carbide & Carbon Corp. 37
Electro Refractories & Alloys Corp. 230
Erie Steel Construction Co. 215

F

Federal Foundry Supply Co., The 2, 174
Federated Metals Div., American Smelting & Refining Co. 28
Fisher Furnace Div., Lindberg Engineering Co. 13
Foundry Equipment Co., The 21
Foundry Service Co. 100, 101
Fremont Flask Co., The 118
Fuller Company 183

G

Giffels & Vallet, Inc. 185
Great Western Mfg. Co. 196
Greene Electric Furnace Co. 232

H

Hauck Mfg. Co. 232
Herman Pneumatic Machine Co. 135
Hewitt-Robins Inc. 95
Hickman, Williams & Co., Inc. 195
Hines Flask Co., The 16, 17
Hough, Frank G., Co., The 11
Hydro-Blast Corp. 112, 113

I

Illinois Clay Products Co. 210
Illinois Testing Laboratories, Inc. 218
Imperial Belting Co. 216
Industrial Equipment Co. 228
Industrial Fabricating, Inc. 147
International Molding Machine Co. 199
International Nickel Co., Inc., The 1
Ironton Fire Brick Co., The 24

J

Jackson Iron & Steel Co., The 235
Jeffrey Mfg. Co. 159
Johns-Manville 180
Joy Mfg. Co. 29

K

Keokuk Electro-Metals Co. 161
Krause, Chas. A., Milling Co. 181
Kwik-Mix Co. 209

Continued on page 256

ADVERTISING INDEX

L

Lanly Co., The 217
Lindberg Engineering Co. 13
Link-Belt Company ..... Back Cover
Logan Co. 117

M

Marshall, L. H., Co. 208
Master Pneumatic Tool Co., Inc., The 224
Mathieson Chemical Corp. .. Inside Front Cover
Maughlin, H. P. Co., The 235
Metal Blast, Inc. 169
Metallizing Co. of America 211
Miller, Herbert F. 234
Miller-Taylor Tool Co. 223
Milwaukee Chaplet & Mfg. Co. 202
Milwaukee Foundry Equipment Co. 25
Modern Equipment Co. 258
Molybdenum Corp. of America 51
Monk Tool Co., The 234
Murphy, Jas. A., & Co. 224, 231

N

National Engineering Co. 109
Newaygo Engineering Co. 18
New Haven Vibrator Co. 227
Nicholls, Wm. H., Co., Inc. ..... Front Cover
Nichols Engineering & Research Corp. .. 12
Norton Co. 41

O

Ohio Electric Mfg. Co., The 89
Ohio Ferro-Alloys Corp. 49
Oliver Machinery Co. 226
Osborn Mfg. Co., The 132, 133

P

Pacific Graphite Co., Inc. 230
Pangborn Corp. 6, 7
Parsons Engineering Corp. 232
Penn Iron Works 227
Pickands Mather & Co. 97
Pittsburgh Metals Purifying Co. 130
Producers Core Sand Corp. 232
Puro-Seal Co., The 232
Putnam, A. H., Co. 230
Pyrometer Instrument Co., The 233

R

Radium Chemical Co., Inc. 235
Redford Iron & Equipment Co. 48
Republic Steel Corp. 26
Rietz Lumber Co. 220
Robeson Process Co. 230
Robins Conveyors Div., Hewitt-Robins Inc. . 95
Roots-Connersville Blower Corp. 207
Rotor Tool Co., The 93
Royer Foundry & Machine Co. 87
Royersford Foundry & Machine Co. 228

S

Schmieg Industries Inc. 205
Schneible, Claude B., Co. 153
Scientific Cast Products Corp., The 221
Semet-Solvay Div., Allied Chemical & Dye Corp. 213
Shepard Niles Crane & Hoist Corp. 198
Silent Hoist & Crane Co. 215
Simplicity Engineering Co. 43
Sly, W. W., Mfg. Co., The 105
Smillie, C. M. & Co. 231
Smith Oil & Refining Co. 163
Smith & Richardson Mfg. Co. 225
Smith, Werner G., Co., The 4, 5
Smooth-On Mfg. Co. 232
Sonken-Galamba Corp. 188
SPO, Inc. 139
Standard Silica Corp. 234
Stearns Magnetic Mfg. Co. 189
Steel City Testing Machines Inc. 212
Sterling Wheelbarrow Co. 52, 213
Stevens, Frederic B., Inc. .. Inside Back Cover
Stone-Wallwork Ltd. 167
Stroman Furnace & Engineering Co. 39

T

Tabor Mfg. Co., The 143
Tamms Industries, Inc. 219
Tennessee Products & Chemical Corp. 123
Toledo Matchplate Co. 230
Truscon Steel Co. 15

U

Union Carbide & Carbon Corp. 37
United Compound Co. 219
United States Electrical Tool Co., The 32
United States Graphite Co., The 155
United States Rubber Co. 110
United States Steel Corp. 226
United States Steel Corp., Subsidiaries .. 226
United States Steel Export Co. 226
Universal Engineering Co. 151

V

Vanadium Corp. of America 137
Velsicol Corp. 20
Vonnegut Moulder Corp. 224

W

Wellman Engineering Co., The 234
Wheland Co., The 98
Whiting Corp. 47
Will, Arthur E. 217
Willson Products, Inc. 182
Woodward Iron Co. 91

Table of Contents, page 3

Classified advertisers, 249, 250, 251, 252, 253

- No copper, nickel contamination
- 500,000 in use, no failures
- Last up to 3 times longer
- A. S. M. E. welded—safer—no leaks
- Better heat transfer
- AMERA-MAG is certified

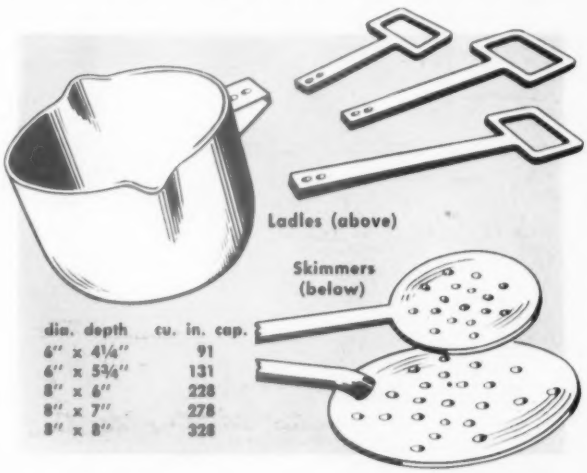
AMERA-MAG crucibles, ladles, skimmers outperform them all

Latest triumph of metallurgy—tough, fine-grained AMERA-MAG steel has qualities that make it best news for magnesium foundrymen in years!

AMERA-MAG Crucibles—Designed for magnesium. No copper, nickel contamination. Formed and welded—lighter, easier handling, yet safer and longer lasting. Resist thermal shock, high-heat and distortion. No cracks or leaks. Retard scaling. Tested, proven vastly superior to cast crucibles, **yet cost no more.**

AMERA-MAG Ladles—Have interchangeable handles. Durable, pressed steel construction—deep drawn to avoid spilling. Spouts designed for proper pouring. Lightweight—less operator fatigue. Spherical bottom reduces metal adherance—easy to clean.

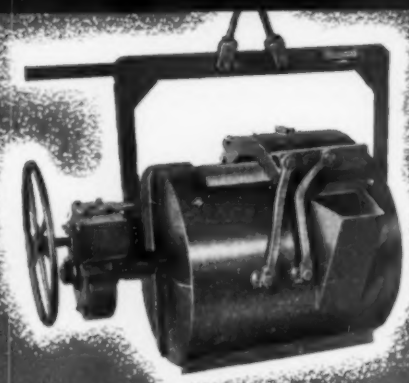
AMERA-MAG Skimmers—Order now for early delivery with your new AMERA-MAG crucibles and ladles. For complete information, write or wire . . .



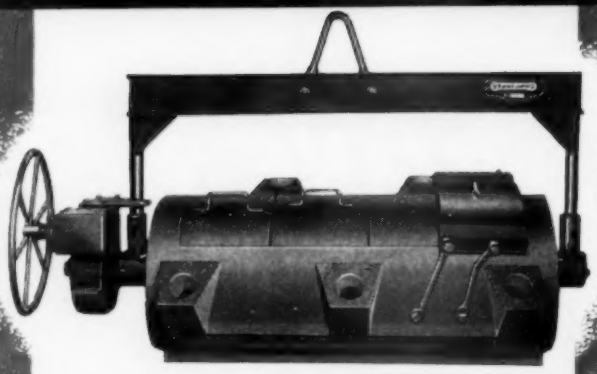
dia.	depth	cu. in. cap.
6"	x 4¼"	91
6"	x 5¾"	131
8"	x 6"	228
8"	x 7"	278
8"	x 8"	328

THE American
John J. Ripich, President
2284 SCRANTON ROAD

TANK & FABRICATING CO.
K. J. Humberstone, Chief Metallurgist
CLEVELAND 13, OHIO

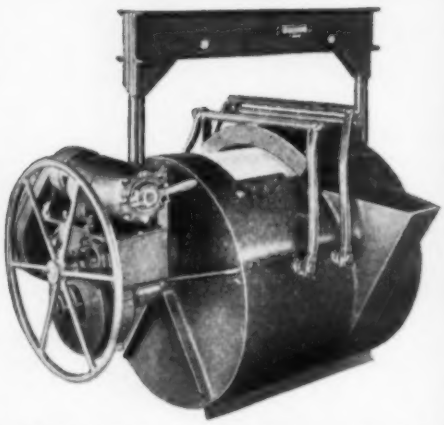


MODERN 800 lb. Geared, Covered and Insulated Cylindrical Ladle with square bail and crane-hook eye.



MODERN Special, 1500 lb. Covered and Insulated Geared Ladle with 5 Spouts.

MODERN 800 lb. Geared, Covered, Straight-Sided Ladle with Square Bail and Crane-Hook Eye. Cover in open position.



MODERN 2000 lb. Cylindrical Covered Ladle with special bail. Tilted by motor or hand wheel.

The *LATEST* in LADLES

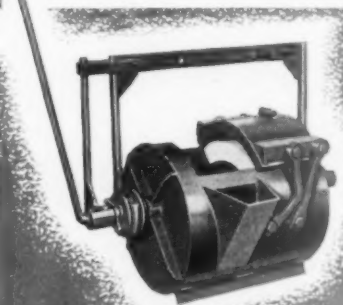
By MODERN EQUIPMENT CO.

- in any Style or Capacity required.
- in step with the Foundry Industry's latest advancements in production methods and volume.
- pioneers in the design and construction of Foundry Ladles for every purpose.

MODERN 1200 lb. Geared, Single Shell, Covered and Insulated Ladle with V-Bail.

MODERN 50,000 lb. capacity, 86" top diameter, geared, tapered bottom-pour ladle.

MODERN 17½" Top-Diameter Tapered Covered Ladle with No. 1 Type Shank, Roller Bearing Trunnions and Detachable Bail.



MODERN 400 lb. Covered and Insulated Cylindrical Ladle, No. 1 Type Shank, Roller Bearing Trunnions, and Detachable Bail.

MODERN Special 5000 lb. U-shaped, Covered and Insulated, Motor Driven Mixing Ladle. A coupling connects gear to ladle; makes bowl removable for re-lining.

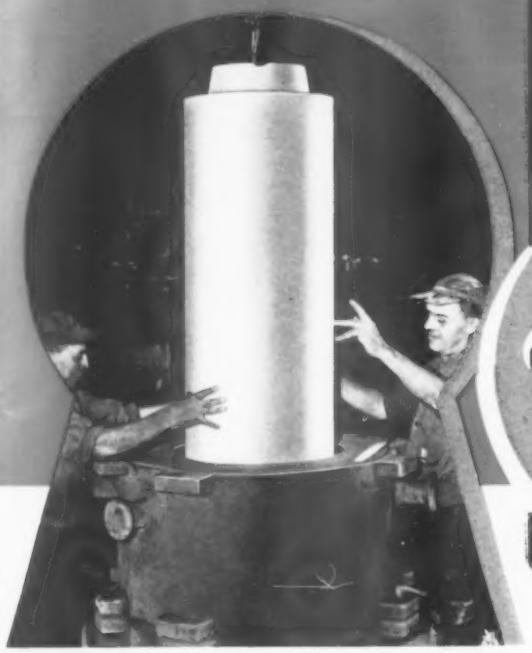
Write for Bulletins 142 and 143.

MODERN EQUIPMENT CO.

PORT WASHINGTON, WISCONSIN

CUPOLAS • CUPOLA CHARGERS • LADLES OF ALL TYPES • POURING DEVICES • METAL POURING SYSTEMS • CRANE AND MONORAIL SYSTEMS • ELECTRIC CRANES.

use these 3 keys...



The textile machine drum shell casting made from the core and mold shown above had to possess a flawless finish inside and out to permit later machining under critical inspection standards. Stevens No. 125 Core Wash was found to be the key to the successful production of this difficult casting job.

Stevens MEN capable in every way of helping you benefit by the proper application of Stevens "job-qualified" foundry facings.

Stevens MATERIALS dependably uniform in quality... kept that way by rigid laboratory control through every phase of manufacture.

Stevens METHODS the direct result of years of experience gained in helping others find the better way to better casting production.

FREDERIC B. STEVENS, INC.

REQUEST FOR SAMPLE OF CORE OR MOLD WASH

Customer's Name _____ Date _____

Persons Interviewed

_____ Title _____

_____ Title _____

Percentage of Bank Sand, If Any _____

Cereal ☐ Pitch ☐ Any Iron Oxide Used _____

Hot ☐ Cold ☐ By Dipping ☐ Spraying ☐ Brushing ☐ Swabbing ☐

Propeller Type Mixer ☐

Paste Type ☐ Powder Form ☐

Hand Torch ☐ Oven Dried ☐ Over Night Fires ☐

In Bags ☐ In Barrels ☐

Salesman _____

Write in This Space

THEY CAN HELP YOU OPEN THE DOOR TO IMPROVED CASTING PRODUCTION

The structure of any business if it is to endure, must be solidly built on a firm foundation of men, methods and materials. On this foundation, for more than half a century, Stevens has built carefully and effectively to qualify as *the* organization most capable of helping you improve your casting production through the use of better foundry facings.

Experienced, responsible foundrymen recognize this capability in their contact with a Stevens representative . . . by the manner in which he justifies his recommendation of a Stevens "job-qualified" foundry facing . . . by the manner in which he qualifies his request to our laboratory for a core or mold coating especially formulated to do the job.

When the recommended foundry facing is put to the test the capability with which it does the job is invariably reflected in a smoother, cleaner casting that requires but a minimum of tumbling, grinding or blasting.

As to Stevens methods . . . wise foundrymen have found that when they use and apply a Stevens foundry facing as recommended for the purpose intended, they can expect . . . and do get superior casting results.

SINCE 1882 — FREDERIC B. STEVENS INCORPORATED — EVERYTHING FOR A FOUNDRY — DETROIT IN MICHIGAN

LEADING MANUFACTURERS AND DISTRIBUTORS OF FOUNDRY FACINGS, EQUIPMENT AND SUPPLIES

FREDERIC B. Stevens INCORPORATED

DETROIT 16, MICHIGAN

Branches • Sales Offices • BUFFALO • NEW HAVEN • INDIANAPOLIS • CLEVELAND

Representatives in Principal Cities

FREDERIC B. STEVENS OF CANADA, LTD. WINDSOR, TORONTO, ONTARIO

FOUNDRY EQUIPMENT AND SUPPLIES DIVISION

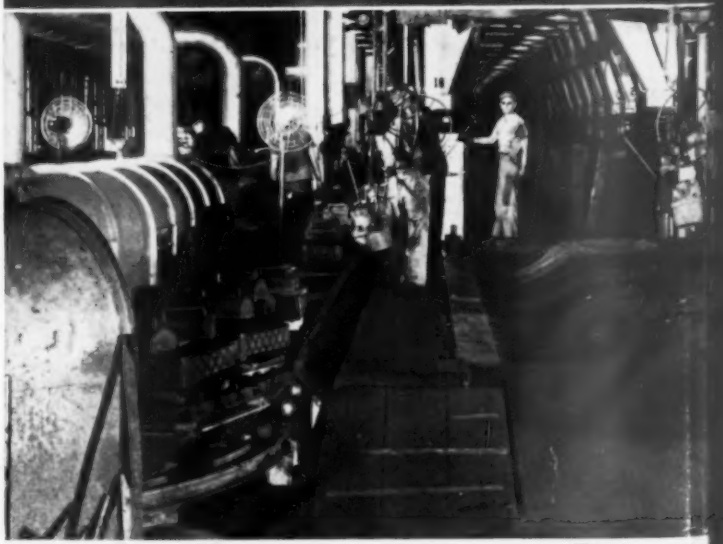
Link-Belt Mold Conveyors also PAY OFF

Mechanization doubles and triples foundry production

Where pouring conditions permit, a Link-Belt Mold Conveyor pays off handsomely in better working conditions because of elimination of smoke by means of exhaust hoods over cooling and shakeout zone. Costs are lowered by centralizing pouring, weight and jacket shifting, and use of automatic mold discharge at shakeout zone.

The illustration at the top shows the mold conveyor section of a Midwest jobbing foundry. Link-Belt engineers designed the layout and installed the equipment including Tru-Trac mold conveyor for handling molds through pouring, cooling and automatic dumping station . . . sand preparation plant . . . oscillating conveyor and castings apron conveyor. Production has tripled without increasing the foundry area. Other foundries mechanized by Link-Belt report comparable increases in production.

We will be glad to talk over your foundry handling and sand preparation problems.



11,820

THE SYMBOL OF QUALITY · LINK-BELT · LB

LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

LINK-BELT CONVEYORS

AND PREPARATION MACHINERY